PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-123731

(43)Date of publication of application : 17.05.1996

(51)Int.Cl. G06F 12/12

G06F 12/08

G11B 20/10

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(54) REPRODUCING DEVICE

(57)Abstract:

PURPOSE: To efficiently transfer data stored in an optical disk to a host computer by sufficiently displaying the effect of a semiconductor memory integrated to improve the efficiency of data transfer.

CONSTITUTION: The reproducing device having a spindle motor 2 for rotating an optical disk D, a reproducing means (an optical pickup 3 or the like) for reproducing information data from the disk D, a control means (a system controller 29 or the like) for controlling the motor 2 and the reproducing means, a data buffer 26 for temporarily storing reproduced data Dr, and an I/F controller 25 for transferring the information data stored in the buffer 26 to a host computer 31 is constituted of allocating a storage area in the buffer 26 to a transfer buffer area whose data transferring source is the disk D and an extended memory area in which data replacement in a data storing part is inhibited.

LEGAL STATUS

[Date of request for examination]	21.12.2000
[Date of sending the examiner's decision of rejection]	
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]	
[Date of final disposal for application]	
[Patent number]	3687115
[Date of registration]	17.06.2005
[Number of appeal against examiner's decision of rejection]	
[Date of requesting appeal against examiner's decision of rejection]	
[Date of extinction of right]	

CLAIMS

[Claim(s)]

[Claim 1] The rotation driving means which it is equipped with a disc-like record medium, and carries out the rotation drive of the disc-like record medium with which it was this equipped, The playback means which reproduces information data to the above-mentioned disc-like record medium, The control means which controls the above-mentioned rotation driving means and the above-mentioned playback means at least, A storage means to hold temporarily the information data reproduced through the above-mentioned playback means, In the regenerative apparatus which has an interface means to transmit the information data memorized by the above-mentioned storage means to an external device according to the read-out

demand from the above-mentioned control means The regenerative apparatus characterized by assigning the storage region of the above-mentioned store to the transmit buffer field whose data transfer origin is a disc-like record medium, and the expanded memory field to which the data permutation of as opposed to [data transfer origin is arbitrary and] a data-hold part was forbidden.

[Claim 2] The regenerative apparatus according to claim 1 characterized by having an expanded memory reservation means to assign the storage region of the above-mentioned storage means to the above-mentioned transmit buffer field and the above-mentioned expanded memory field logically, based on the expanded memory reservation demand from the above-mentioned external device.

[Claim 3] To the data readout demand to the predetermined address on the above-mentioned disc-like record medium determined beforehand Only a first time demand transmits the data of the applicable address on the above-mentioned disc-like record medium to the above-mentioned external device through the above-mentioned expanded memory field. The 1st transfer means which transmits the data currently held to the above-mentioned expanded memory field to the read-out demand of the 2nd henceforth at the above-mentioned external device, The regenerative apparatus according to claim 1 or 2 characterized by having the 2nd transfer means which transmits the data of the applicable address on the above-mentioned disc-like record medium to data readout demands other than the above-mentioned predetermined address on the above-mentioned disc-like record medium through the above-mentioned transmit buffer field at the above-mentioned external device.

[Claim 4] The regenerative apparatus according to claim 1, 2, or 3 characterized by having the 3rd transfer means which transmits the data currently temporarily held to the above-mentioned transmit buffer field to an expanded memory field based on the transfer request between fields from the above-mentioned external device.

[Claim 5] A regenerative apparatus claim 1 characterized by having the data write-in means which writes the data transmitted from the above-mentioned external device in the above-mentioned expanded memory field based on the

data write request from the above-mentioned external device - given [any 1] in four.

[Claim 6] The regenerative apparatus according to claim 2 carry out canceling logical allotment with the above-mentioned transmit buffer field to the above-mentioned storage means and the above-mentioned expanded memory field by the above-mentioned expanded memory reservation means, and having the reservation discharge means which makes the expanded memory field concerning the whole storage region of the above-mentioned storage means, or the demand concerned a transmit buffer field based on the reservation discharge demand from the above-mentioned external device as the description.

[Claim 7] The regenerative apparatus according to claim 1 characterized by the above-mentioned expanded memory field consisting of semiconductor memory of a non-volatile among the above-mentioned storage means.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the regenerative apparatus which held temporarily the information data reproduced [especially] from the disc-like record medium about the disc-like record medium, for example, the regenerative apparatus which reproduces information data to a magneto-optic disk in CD-ROM or a phase-change optical disk list, and was connected outside and which was transmitted, for example to the host computer.

[0002]

[Description of the Prior Art] Recently, in data processing using a computer, use of the auxiliary storage unit which can treat mass data is indispensable. It is used for the Electronic Book which projects on a monitor the background image, icon image, or character image especially decided beforehand to be

image data and a voice data list in data processing treating dictionary data etc., and can be used instead of a dictionary and a lexicon at the computer operation and the computer-game list by the so-called GUI (graphical user interface).

[0003] It is becoming general from data volume becoming huge using [of the optical disk (CD-ROM) only for playbacks which can record mass data] the above-mentioned image data etc.

[0004] He is trying to incorporate semiconductor memory in the regenerative apparatus of an optical disk in such a situation, now so that the data recorded on the optical disk can be efficiently transmitted to a host computer. That is, it is because a bursty data transfer rate improves by storing up the data from an optical disk temporarily in this semiconductor memory.

[0005] Even if data are generally stored into the above-mentioned semiconductor memory because a host computer performs the read-out demand of data to an optical disk, are recording of data is temporary. It is because the data of the assignment which the data of the past when it was memorized by semiconductor memory in other than the range of the data with which next data readout assignment is accumulated in current semiconductor memory (i.e., when the read-out addresses on an optical disk differ) were eliminated, and was newly read from the optical disk are stored.

[0006]

[Problem(s) to be Solved by the Invention] By the way, when reading data from an optical disk, the case where the data of a certain address are read frequently, and the address of arbitration may be read at random. It sets. In such a case, the conventional regenerative apparatus Since the data read from the optical disk are once stored in semiconductor memory and he is trying to transmit to a host computer, After reading the data of the address where the read-out frequency on an optical disk is high and transmitting to a host computer When the data of the random address on an optical disk were read and it transmits to a host computer, Since the latter data will be occupied by semiconductor memory, when reading the data of the address where read-out frequency is high again, the data of the address concerned must be again read from an optical disk to it.

[0007] It came to be dependent on the mean access time of a regenerative apparatus, and the problem that effectiveness of the semiconductor memory incorporated in order to aim at improvement in data transmission efficiency could not fully be demonstrated had produced the access time of the data in the conventional regenerative apparatus from such a thing.

[0008] The place which this invention was made in view of the above-mentioned technical problem, and is made into the purpose can fully demonstrate the effectiveness of the semiconductor memory incorporated in order to aim at improvement in data transmission efficiency, and is to offer the regenerative apparatus which can make the data on an optical disk transmit to a host computer efficiently.

[0009] Moreover, other purposes of this invention are to offer the regenerative apparatus which can use the semiconductor memory in a regenerative apparatus as external storage of a host computer, when the capacity of the memory which a host computer owns runs short.

[0010] Moreover, after a power-source halt can make the programming data about a regenerative apparatus, and the programming data about a host computer memorize, and other purposes of this invention are to offer the regenerative apparatus which can perform systems maintenance easily.

[0011]

[Means for Solving the Problem] The rotation driving means 2 to which it is equipped with the disc-like record medium D, and this invention carries out the rotation drive of this disc-like record medium D with which it was equipped, The playback means which reproduces information data to the disc-like record medium D (an optical pickup 3, the RF amplifier section 21, a demodulator circuit 22, and decoder 24 grade), The control means which controls the rotation driving means 2 and a playback means at least (the mechanism controller 28, a system controller 29, and servo control section 27), A storage means 26 to hold temporarily the information data Dr reproduced through the above-mentioned playback means, In the regenerative apparatus which has an interface means 25 to transmit the information data memorized by this storage means 26 to an external device 31 according to the read-out demand from the above-mentioned control means The storage region of the above-

mentioned storage means 26 is assigned to the transmit buffer field TZ whose data transfer origin is the disc-like record medium D, and the expanded memory field EZ to which the data permutation of as opposed to [data transfer origin is arbitrary and] a data-hold part was forbidden, and is constituted.

[0012] In this case, you may make it establish an expanded memory reservation means (the reservation demand means 76 and reservation processing means 96) to assign the storage region of the storage means 26 to the transmit buffer field TZ and the expanded memory field EZ logically, based on the expanded memory reservation demand from an external device 31.

[0013] To moreover, the data readout demand to the predetermined address on the disc-like record medium D determined beforehand Only a first time demand transmits the data of the applicable address on the disc-like record medium D to an external device 31 through the expanded memory field EZ. The 1st transfer means which transmits the data currently held to the above-mentioned expanded memory field EZ to the read-out demand of the 2nd henceforth at an external device 31 (the extended read-out demand means 78 and extended read-out processing means 98), To data readout demands other than the predetermined address on the disc-like record medium D You may make it establish the 2nd transfer means (the read-out demand means 77 and read-out processing means 97) which transmits the data of the applicable address on the disc-like record medium D to an external device 31 through the transmit buffer field TZ.

[0014] Moreover, you may make it establish the 3rd transfer means (the block transfer-request means 79 and block transfer processing means 99) which transmits the data currently temporarily held to the transmit buffer field TZ to the expanded memory field EZ based on the transfer request between fields from an external device 31.

[0015] Moreover, you may make it establish the data write-in means (the extended write request means 80 and extended write-in processing means 100) which writes the data transmitted from the external device 31 in the expanded memory field EZ based on the data write request from an external

device 31.

[0016] Moreover, logical allotment with the transmit buffer field TZ to the storage means 26 and the expanded-memory field EZ by the expanded-memory reservation means (the reservation demand means 76 and reservation processing means 96) cancels, and the reservation discharge means (a reservation discharge processing means 102) which makes the expanded-memory field EZ concerning the whole storage region of the storage means 26 or the demand concerned the transmit buffer field TZ may make prepare based on the reservation discharge demand from an external device 31.

[0017] In addition, you may make it constitute the expanded memory field EZ from semiconductor memory of a non-volatile among the storage means 26.

[0018]

[Function] In the regenerative apparatus concerning this invention, the rotation drive of the disc-like record medium D with which the rotation driving means 2 was equipped is carried out by the rotation driving means 2, and the information data recorded on the disc-like record medium D through the playback means are reproduced.

[0019] The information data reproduced with the above-mentioned playback means are temporarily stored in the transmit buffer field TZ among the storage regions of the storage means 26, and are transmitted to an external device 31 through the interface means 25 after that. To this transmit buffer field TZ, the data on the disc-like record medium D chiefly reproduced through the playback means will be temporarily stored from that data transfer origin being the disc-like record medium D. In this case, the past data will be eliminated and current data will be overwritten.

[0020] On the other hand, the data reproduced with the above-mentioned playback means are stored also in the expanded memory field EZ among the storage regions of the storage means 26. Since the data permutation to the accumulated data-hold part is forbidden unlike the case of the transmit buffer field TZ, data elimination of the past is carried out and it is not said that current data are overwritten. That is, the data once stored in the expanded memory field EZ will be held on this expanded memory field EZ, without being

influenced by the data readout from the subsequent disc-like record medium D.

[0021] Therefore, if the data of the address where the read-out frequency on the disc-like record medium D is high are stored up in the expanded memory field EZ and it is made to store up the data of the other address in the transmit buffer field TZ temporarily When the data of the address where read-out frequency is high are transmitted to an external device 31, The data which it becomes unnecessary to say that data are read from the applicable address on the disc-like record medium D through a playback means one by one, and are stored in the expanded memory field EZ can be made transmitted to the direct external device 31.

[0022] Consequently, it is lost that the data-access time amount over a regenerative apparatus is dependent on the mean access time of a regenerative apparatus, and it becomes possible to demonstrate the engine performance more than this mean access time in false.

[0023] Since it is such, the effectiveness of the storage means 26 (for example, semiconductor memory) incorporated in order to aim at improvement in data transmission efficiency can fully be demonstrated, and the data on the disc-like record medium D can be made to transmit to an external device 31 efficiently in the regenerative apparatus concerning this invention.

[0024] Moreover, since the data transfer origin of the expanded memory field EZ is arbitrary, it becomes possible to make it accumulate in this expanded memory field EZ also of the data transmitted from the external device 31. In this case, when the capacity of the memory which an external device 31 owns runs short, it becomes possible to use this expanded memory field EZ as external storage of an external device 31.

[0025] Moreover, in the above-mentioned configuration, it is based on an expanded memory reservation demand from an external device 31. [when an expanded memory reservation means to assign the storage region of the storage means 26 to the transmit buffer field TZ and the expanded memory field EZ logically is established] When there is no expanded memory reservation demand from an external device 31, a storage region will be used

as a transmit buffer field TZ as it is, and the data from the disc-like record medium D will be transmitted to an external device 31 through a storage region.

[0026] And based on the expanded memory reservation demand from an external device 31, a storage region is logically assigned to the transmit buffer field TZ and the expanded memory field EZ through an expanded memory reservation means, and a data access which was mentioned above is performed through the transmit buffer field TZ and the expanded memory field EZ after that. That is, the data of the random address on the disc-like record medium D are transmitted to an external device 31 through the transmit buffer field TZ from the disc-like record medium D, and the data of the address where read-out frequency is high are transmitted to an external device 31 through the expanded memory field EZ. Moreover, the data from an external device 31 are stored up in the expanded memory field EZ.

[0027] thus, in the above-mentioned configuration it not only uses the storage region of the storage means 26 as a transmit buffer field TZ whose data transfer origin is the disc-like record medium D, but Since it can realize only by giving the expanded memory reservation demand from an external device 31 when data transfer origin wants to use some of the fields as arbitrary expanded memory fields EZ, The storage means 26 (semiconductor memory) built in the regenerative apparatus can be made to be fully able to utilize, and the effectiveness by this storage means 26 can fully be demonstrated.

[0028] Set in the above-mentioned configuration and to moreover, the data readout demand to the predetermined address on the disc-like record medium D determined beforehand Only a first time demand transmits the data of the applicable address on the disc-like record medium D to an external device 31 through the expanded memory field EZ. The 1st transfer means which transmits the data currently held to the expanded memory field EZ to the read-out demand of the 2nd henceforth at an external device 31, The following actuation will be performed when the 2nd transfer means which transmits the data of the applicable address on the disc-like record medium D to data readout demands other than the above-mentioned predetermined address on the disc-like record medium D through the transmit buffer field TZ

at an external device 31 is established.

[0029] When there is a read-out demand of data other than the predetermined address with which it was beforehand determined on the disc-like record medium D, the data reproduced through the playback means are transmitted to an external device 31 through the 2nd transfer means through the transmit buffer field TZ of the storage region in the storage means 26. Also when transmitting data other than the predetermined address to an external device 31 after next time, the data of the above-mentioned address reproduced with the playback means are transmitted to an external device 31 through the transmit buffer field TZ through the 2nd transfer means. That is, while sequential overwrite of the data in the transmit buffer field TZ is carried out, data transfer to an external device 31 is performed.

[0030] On the other hand, when there is a read-out demand of the data of the predetermined address with which it was beforehand determined on the disc-like record medium D First, in a first time demand, the data of the above-mentioned address reproduced through the playback means are stored in the expanded memory field EZ of the storage region in the storage means 26 through the 1st transfer means. Furthermore, the data stored in the expanded memory field EZ through this 1st transfer means will be transmitted to an external device 31.

[0031] After next time, when transmitting the data of the predetermined address to an external device 31, the data stored in the expanded memory field EZ will be transmitted to an external device 31 as it is through the 1st transfer means. That is, when transmitting the data of the predetermined address to an external device 31, the data which it becomes unnecessary to say that data are read from the applicable address on the disc-like record medium D through a playback means one by one, and are stored in the expanded memory field EZ can be made transmitted to the direct external device 31.

[0032] Moreover, in the above-mentioned configuration, it is based on the transfer request between fields from an external device 31. [when the 3rd transfer means which transmits the data currently temporarily held to the transmit buffer field TZ to the expanded memory field EZ is established] For

example, when the data of the 2nd predetermined address on the disc-like record medium D determined in late-coming are stored in a transmit buffer field through the 2nd transfer means Based on the transfer request between fields from an external device 31, the data in the transmit buffer field TZ will be transmitted to the expanded memory field EZ through the 3rd transfer means.

[0033] This becomes effective when the address where read-out frequency is high in late-coming becomes clear. That is, in accordance with [of a regenerative apparatus] use, the address where read-out frequency is high may be proved in late-coming that it is the case where it has become clear from the beginning. When the data of the address where this read-out frequency that became clear in late-coming is high are stored in a transmit buffer field through the 2nd transfer means, this invention It becomes possible to make the expanded memory field EZ carry out transfer are recording through the 3rd transfer means, and after next time, in case the data of the address where the read-out frequency which became clear [above-mentioned] in late-coming is high are transmitted The data which are not from the disc-like record medium D, and are stored in the expanded memory field EZ can be transmitted to an external device 31. Consequently, the data transfer between a regenerative apparatus and an external device 31 can be made to perform still more efficiently.

[0034] Moreover, in the above-mentioned configuration, when the data write-in means which writes the data transmitted from the external device 31 in the expanded memory field EZ is established based on the data write request from an external device 31, it becomes possible to store up the data transmitted from the external device 31 through the data write-in means in this expanded memory field EZ based on the data write request from an external device 31. In this case, when the capacity of the memory which an external device 31 owns runs short, it becomes possible to use this expanded memory field EZ as external storage of an external device.

[0035] Moreover, in the above-mentioned configuration, based on the reservation discharge demand from an external device 31, logical allotment with the transmit buffer field TZ to the storage means 26 and the expanded

memory field EZ by the expanded memory reservation means is canceled, and when as follows [the reservation discharge means which makes the expanded memory field EZ concerning the whole storage region of the storage means 26 or the demand concerned the transmit buffer field TZ is established, and], it becomes effective.

[0036] Namely, it sets to access to the disc-like record medium D with which the fixed data which do not need to perform a data access frequently were recorded (for example, when the data currently recorded on the disc-like record medium D are a sequential file format etc.). By making into the transmit buffer field TZ the expanded memory field EZ which starts the whole record section or the demand concerned with a reservation discharge means, 1 time of data transfer size can be enlarged, and the access time to the above disc-like record media D can be shortened efficiently.

[0037] Moreover, in the above-mentioned configuration, when the expanded memory field EZ is constituted from semiconductor memory of a non-volatile among the storage means 26, it sets. The data created by program actuation in the regenerative apparatus, for example, data created by the address read to a degree, and various parameter lists by program actuation in the external device, For example, by writing the high address, various parameters, etc. of read-out frequency which became clear in late-coming in the expanded memory field EZ through a data write-in means Also in the power-source halt back or sudden power off, the above-mentioned data can be held and it becomes possible to perform subsequent systems maintenance easily.

[0038]

[Example] The example (it is hereafter described as the regenerative apparatus only applied to an example) which applied the optical disk (CD-ROM) only for [the regenerative apparatus concerning this invention] playbacks to the CD-ROM drive equipment used as a record medium as external storage of a host computer hereafter is explained referring to drawing 1 - drawing 55 .

[0039] As the regenerative apparatus concerning this example is shown in drawing 1 , it has the turntable 1 on which it is equipped with optical disk D at a tip. Optical disk D with which this turntable 1 was equipped For example, the

spindle motor 2 which an one direction is made to rotate by the CLV (constant linear velocity) method, It has the signal-processing system 4 which restores to the regenerative signal Sr from the optical pickup 3 which reproduces an information signal to this rotating optical disk D, and this optical pickup 3, and is sent out outside as playback data, and is constituted.

[0040] Based on the information signal with which optical disk D was recorded, the concentric circle or the truck formed spirally is formed in one field for the concavo-convex pattern, i.e., a phase pit. It is formed of the reflective film which consists of metals formed so that the phase pit formed in one field of the disk substrate which specifically consists of synthetic-resin material which has light transmission nature, such as a polycarbonate and PMMA, and this disk substrate might be covered, such as aluminum and Au, and the protective layer formed so that the above-mentioned reflective film might be covered for the purpose of protecting this reflective film.

[0041] furthermore, this optical disk D -- among those, ROM data, such as dictionary data, are recorded on the part except the system area where it is recorded on a part for a periphery as pit information by the concavo-convex pattern, the data about trucks, such as an attribute, for example, a track pitch, the number of trucks, etc., i.e., the TOC data, of this optical disk D, and this TOC data was recorded by the image data and voice data list by the phase pit.

[0042] An optical pickup 3 with for example, the known sliding mechanism 7 for optical pickups which makes a subject a linear motor 5 and the guide shaft 6 The semiconductor laser which migration in the direction of a path of optical disk D is enabled, and is the light source of a laser beam at least to the interior (not shown), The objective lens 8 which makes the recording surface of optical disk D condense laser beam L by which outgoing radiation was carried out from this semiconductor laser, It has the photodetector (not shown) which detects the reflected light in optical disk D of laser beam L by which outgoing radiation was carried out from semiconductor laser, and is changed into an electrical signal (namely, regenerative signal), and the beam splitter (not shown) which divides the above-mentioned reflected light into outgoing radiation light and a space target from semiconductor laser, and is constituted.

[0043] The above-mentioned objective lens 8 is made respectively movable in the minute range by the easy 2-dimensional actuator 9 of a configuration in the attachment-and-detachment direction of optical disk D, and the direction of a path of optical disk D. This 2-dimensional actuator 9 consists of magnetic circuits which consist of for example, a focal coil, a tracking coil, and a magnet (not shown [both]).

[0044] In addition, in the above-mentioned optical pickup 3, another photodetector for detecting the optical reinforcement of laser beam L other than the above-mentioned photodetector is arranged, and the detecting signal from this photodetector is supplied to the control circuit (APC circuit) 10 on the strength [optical] established in the exterior of an optical pickup 3. Based on the detecting signal from the above-mentioned photodetector, this APC circuit 10 controls the output of a laser light source so that a laser light source oscillates to stability.

[0045] On the other hand, a signal-processing system 4 has the system controller 29 which controls the RF amplifier section 21, a demodulator circuit 22, D/A converter 23, a decoder 24, the interface protocol controller (it is only hereafter described as an I/F controller) 25, a data buffer 26, the servo control section 27, the mechanism controller 28, and these various circuits to be shown in drawing 1 , and the host computer 31 is further connected to the latter part of the above-mentioned I/F controller 25 through the interface bus 30 in this example. The mechanism controller 28 and system controller 29 of each other which consisted of microprocessing units, respectively are connected with the internal bus 32.

[0046] Moreover, the motorised circuit 41 for supplying a drive current to this spindle motor 2 is connected to the preceding paragraph of the spindle motor 2 which carries out the rotation drive of the optical disk D, and the drive circuit 42 for focuses for supplying an exciting current to a focal coil and a tracking coil and the drive circuit 43 for tracking are connected to the preceding paragraph of the 2-dimensional actuator 9 made to move an objective lens 8 to the minute range, respectively. Moreover, the motorised circuit 44 for supplying a drive current to this motor 5 is connected to the preceding paragraph of the motor 5 which is the driving source of the sliding mechanism

7 for optical pickups.

[0047] The RF amplifier section 21 amplifies the regenerative signal Sr from the above-mentioned photodetector in an optical pickup 3, and separates it into the information signal component Si, the focal error signal component Sf, and the tracking error signal component St from this playback magnification signal further. Moreover, a demodulator circuit 22 and the servo control section 27 are connected to the latter part of this RF amplifier section 21, the above-mentioned information signal component Si is supplied to a demodulator circuit 22, and the focal error signal component Sf and the tracking error signal component St are supplied to the servo control section 27.

[0048] A demodulator circuit 22 is a circuit which carries out the EFM recovery of the information signal component Si from the RF amplifier section 21, performs decryption processing of an error correction etc. further, and is changed into the digital playback data Di. Moreover, a reference signal is extracted in this demodulator circuit 22 from the above-mentioned information signal component Si, and the spindle servo error signal generation circuit (not shown) which generates the spindle servo error signal Ss for carrying out the rotation drive of the optical disk D with the same linear velocity as mastering having been carried out based on this reference signal, and is outputted to the motorised circuit 41 is included in it.

[0049] The servo circuit for motors where the servo control section 27 performs servo control to the interior to the motor of a focus servo circuit, a tracking servo circuit, and the sliding mechanism for optical pickups is incorporated (not shown [both]), and the focal error signal component Sf from the RF amplifier section 21 and the tracking error signal component St are inputted into the servo drive control signal lists concerning [servo circuits various / these] the servo control from the mechanism controller 28 respectively, such as data and driving signals (servo gain etc.).

[0050] And the above-mentioned focus servo circuit among this servo control section 27 On the focal error signal component Sf and concrete target from the RF amplifier section 21 It is based on the signal Sf which performed the predetermined operation and obtained the detecting signal according to the amount of reflected lights from this mirror side in accordance with the laser

beam exposure to the mirror side formed in optical disk D in the RF amplifier section 21. By driving and controlling the 2-dimensional actuator 9 of an optical pickup 3, it is the circuit which is made to move an objective lens 8 in the attachment-and-detachment direction of optical disk D, and performs the focus control.

[0051] Specifically, the above-mentioned tracking servo circuit is a circuit which is made to move an objective lens 8 in the direction of a path of optical disk D, and performs the tracking adjustment by being based on the signal which performed the predetermined operation and obtained the tracking error signal component St from the RF amplifier section 21, and the detecting signal accompanying detection of a guide rail currently formed in optical disk D in the RF amplifier section 21, and driving and controlling the 2-dimensional actuator 9 of an optical pickup 3 among the servo control section 27, for example.

[0052] The above-mentioned servo circuit for motors is a circuit which moves an optical pickup 3 to a desired truck among the servo control section 27 by driving the motor 5 of the sliding mechanism 7 for optical pickups based on the seek operation demand from the mechanism controller 28, a track jump demand, and a step jump demand.

[0053] A decoder 24 is a circuit which changes the playback data Di outputted from the demodulator circuit 22 into the code gestalt Dr which a host computer 31 deals with, i.e., ROM data. Moreover, the address data (it is hereafter described as ROM address data) Dar corresponding to the ROM data Dr are obtained from this decoder 24. It is a circuit which changes into the regenerative signal Sa of an analog the playback data Di outputted from the demodulator circuit 22, the data especially recorded on optical disk D are voice data, and D/A converter 23 is effective when taking out as a sound signal Sa of an analog.

[0054] The sub-code address data Da are inputted among the playback data Di with which the mechanism controller 28 is outputted from a demodulator circuit 22.

[0055] As typical actuation of this mechanism controller 28, a read-out control signal is outputted from a system controller 29 to the mechanism controller 28,

for example based on the input of the read-out demand to the system controller 29 from a host computer 31.

[0056] the truck corresponding to the demand address (read-out address) based on the sub-code address data Da into which the mechanism controller 28 is inputted as the input of the read-out control signal from the above-mentioned system controller 29 from a demodulator circuit 22 -- up to the truck of one this side -- an optical pickup 3 -- seek operation -- it controls to track-jump-operate or step jump operate.

[0057] From the phase which became this side of target truck 1 truck, a system controller 29 distinguishes the ROM address data Dar from a decoder 24, and the read-out address data from a host computer 31, outputs the read-out control signal according to a distinction result to the mechanism controller 28, and draws an optical pickup 3 in the part corresponding to the read-out address through the mechanism controller 28.

[0058] And when an optical pickup 3 is located in the truck corresponding to the read-out address, a system controller 29 outputs a read-out signal to the mechanism controller 28. The mechanism controller 28 outputs the data Dc for control to the RF amplifier section 21 and a demodulator circuit 22 based on the input of the read-out signal from a system controller 29. The data currently recorded on this truck will be reproduced by this.

[0059] And only the data of the address with a demand will be transmitted to a data buffer 26 through the I/F controller 25 by supplying the ROM address data Dar to a system controller 29 in the phase where the playback data Di are supplied to the decoder 24, from a demodulator circuit 22.

[0060] Here, as the above-mentioned data buffer 26 consists of semiconductor memory, such as DRAM or SRAM, for example, it is shown in drawing 2 (a), from the head logical address (relative sector address) of the storage region in a data buffer 26 to the predetermined logical address (relative sector address) is assigned as a transmit buffer field TZ, and from the above-mentioned predetermined logical address +1 to the last logical address is assigned as an expanded memory field (a slash shows) EZ. As shown in drawing 2 (b) in addition to the allotment shown by drawing 2 (a), of course, two or more expanded memory fields EZ may be assigned.

[0061] The playback data Di from a decoder 24 are usually stored in the transmit buffer field TZ among the above-mentioned data buffers 26. The playback data Di stored in this transmit buffer field TZ will be transmitted to a host computer 31 through the I/F controller 25 after that.
[0062] And the following is prepared as a command with which the regenerative apparatus concerning this example is equipped.
(1) Reservation command (2) Read-out command (3) Extended read-out command (4) Block transfer command (5) Extended write-in command (6) Extended transfer command (7) Reservation discharge command [0063] These commands, It is for choosing how using a data buffer 26 except for the read-out command of (2). The above-mentioned command inputted from a host computer 31 is sent to the I/F controller 25 according to interface protocols, such as SCSI (Small Computer System Interface) currently generally used, with a regenerative apparatus.
[0064] The I/F controller 25 tells having used the interrupt signal for the system controller 29, and having received the command, after receiving the command from a host computer 31. A system controller 29 recognizes that the command was sent by this interrupt signal from the host computer, and receives a command from the I/F controller 25 after that. The system controller 29 which received the command interprets the contents of the command, and performs processing according to a command.
[0065] Below, detail of a command is given. In addition, the address in the storage region of a data buffer 26 shown by drawing 2 here is treated as what is the logical address corresponding to the data for 1 sector in optical disk D.
[0066] (1) Reserve an expanded memory field to the storage region of the reservation command data buffer 26. This command has the initiation logical address and the termination logical address of an expanded memory as a parameter. The field of the remainder [field / from the initiation logical address of an expanded memory to the termination logical address] as an expanded memory field EZ is used as a transmit buffer field TZ by this.
[0067] (2) It is a command for the read-out command host computer 31 to read via the transmit buffer field TZ by using the playback data Di from optical disk D as the ROM data Dr.

[0068] This read-out command has the number of sectors of the start address of the data read from optical disk D, and the data to read as a parameter. If a system controller 29 receives this command, this system controller 29 will check whether the demanded data are first memorized to the transmit buffer field TZ. If the data of a demand exist in the transmit buffer field TZ, it will be made to go via the I/F controller 25, and the data will be transmitted to a host computer 31.

[0069] If the data of a demand do not exist in the transmit buffer field TZ, it directs to search optical disk D to the mechanism controller 28 by internal bus 32 course. The mechanism controller 28 controls the RF amplifier section 21, the servo control section 27, and a demodulator circuit 22, respectively, and reproduces data from the applicable address of optical disk D.

[0070] The obtained playback data Di are changed into the ROM data Dr by the decoder 24. The ROM-address information Dar acquired as a result of decoding the playback data Di to coincidence at a system controller 29 is acquired. A system controller 29 controls the I/F controller 25 to transmit only the data demanded from the host computer 31 based on this ROM-address information Dar to the transmit buffer field TZ.

[0071] If the data required of the transmit buffer field TZ are stored, this stored data will be transmitted to a host computer 31 via the I/F controller 25.

[0072] (3) It is a command for transmitting the data from optical disk D to the appointed field of the extended read-out command expanded memory field EZ, and transmitting the data stored in this appointed field EZ to a host computer 31. A procedure is [0073]. [equal to what was described above "(2) read-out command"] (4) It is a command for transmitting the data in the block transfer command transmit buffer field TZ to the appointed field of the expanded memory field EZ. By this command, the write-in initiation logical address in the data transfer initiation logical address in the transmit buffer field TZ, the number of transfer sectors, and the expanded memory field EZ is specified.

[0074] (5) It is a command for writing the data from a host computer 31 in the appointed field of the extended write-in command expanded memory field EZ. By this command, after the write-in initiation logical address and the number of transfer sectors in the expanded memory field EZ are specified, data are

transmitted from a host computer 31.

[0075] (6) It is a command for transmitting the data of the appointed field of the extended transfer command expanded memory field EZ to a host computer 31. By this command, after the read-out initiation logical address and the number of transfer sectors in the expanded memory field EZ are specified, data are transmitted to a host computer 31.

[0076] (7) It is the command which makes the expanded memory field EZ which cancels the reservation field of the reservation discharge command expanded memory field EZ, and has been set as the whole storage region of a data buffer 26, or the object of reservation discharge the transmit buffer field TZ. By this command, the initiation logical address of the expanded memory field EZ is specified.

[0077] Hereafter, actuation of the regenerative apparatus by the above-mentioned command, especially the actuation which made the subject delivery of data to a data buffer 26 are explained, referring to the hard configuration, functional block, and the flow chart of a system controller 29 in the hard configuration of the I/F controller 25, functional block and a flow chart, and a list.

[0078] When the hard configuration of the I/F controller 25 is explained based on drawing 3 , first, this I/F controller 25 RAM52 for actuation used as a field for actuation of the program ROM 51 into which various programs were registered, and the program read from this program ROM 51, The data RAM 53 in which the variable data created by digital data and the program from an external circuit (a decoder 24, a host computer 31, system controller 29) are stored, It has the input port 54 to which the input data from an external circuit is supplied, the output port 55 for outputting the data stored in the data RAM 53 to an external circuit, and CPU (a control unit and arithmetic and logic unit)56 which controls these various circuits, and is constituted.

[0079] Delivery of the data between each circuit is performed through the data bus DB drawn from CPU56, and the various above-mentioned circuits are constituted so that it may be controlled by CPU56 through the control bus (not shown) further drawn from CPU56, respectively. Moreover, a decoder 24, a host computer 31, and the various digital data from a system controller 29 are

supplied to a data bus DB through input port 54.

[0080] When the hard configuration of a system controller 29 is explained based on drawing 7 , next, this system controller 29 RAM62 for actuation used as a field for actuation of the program ROM 61 into which various programs were registered, and the program read from this program ROM 61, The data RAM 63 in which the variable data created by digital data and the program from an external circuit (the I/F controller 25, mechanism controller 28) are stored, It has the input port 64 to which the input data from an external circuit is supplied, the output port 65 for outputting the data stored in the data RAM 63 to an external circuit, and CPU (a control unit and arithmetic and logic unit)66 which controls these various circuits, and is constituted.

[0081] Delivery of the data between each circuit is performed through the data bus DB drawn from CPU66, and the various above-mentioned circuits are constituted so that it may be controlled by CPU66 through the control bus (not shown) further drawn from CPU66, respectively. Moreover, the various digital data from the I/F controller 25 and the mechanism controller 28 are supplied to a data bus DB through input port 64.

[0082] Next, actuation of the I/F controller 25 and a system controller 28 is explained to a detail.

[0083] First, in the I/F controller 25, a system check, a memory check, a setup, etc. in the initial actuation 25, for example, an I/F controller, are performed to coincidence with powering on in step S1 of drawing 5 .

[0084] Then, in step S2, the command from [from a program ROM 51] a host computer 31 is outputted to a system controller 29. Furthermore, at the same time the data transfer processing program which is a means 71 (refer to drawing 4) to perform data transfer processing based on the parameter according to the above-mentioned command from a system controller 29 is read and it is written in RAM52 for actuation Since the data which set working [the above-mentioned program] and were created are saved temporarily, the working area used for delivery of the variable of each routine which constitutes these programs etc. is assigned in RAM52 for actuation.

[0085] The data transfer processing program 71 read to above-mentioned RAM52 for actuation A distinction means 72 to perform various distinction as

shown in drawing 4 , and a command receipt means 73 to receive the command from a host computer 31, It has an interrupt signal output means 74 to output an interrupt signal to a system controller 29 based on having received the command with the command receipt means 73, and the various demand processing means 75 which are means for branching the processing according to the above-mentioned command, and is constituted.

[0086] The means alternatively activated according to the above-mentioned command in the various above-mentioned demand processing means 75 is as follows.

[0087] ** Output the reservation command from a host computer 31 to a system controller 29. And the information table from a system controller 29 is received. The read-out command from the reservation demand means 76 ** host computer 31 which assigns the expanded memory field EZ to a data buffer 26 logically based on the data of this information table is outputted to a system controller 29. And according to the parameter from a system controller 29, the transmit buffer field TZ of a data buffer 26 is minded for the playback data (ROM data) from optical disk D. The extended read-out command from the read-out demand means 77 ** host computer 31 transmitted to a host computer 31 is outputted to a system controller 29. And according to the parameter from a system controller 29, the expanded memory field EZ of a data buffer 26 is minded for the playback data from optical disk D. The block transfer command from the extended read-out demand means 78 ** host computer 31 transmitted to a host computer 31 is outputted to a system controller 29. And the extended write-in command from the block transfer-request means 79 ** host computer 31 which writes the data of the transmit buffer field TZ in the expanded memory field EZ of a data buffer 26 according to the parameter from a system controller 29 is outputted to a system controller 29. And the extended transfer command from the extended write request means 80 ** host computer 31 which writes the transfer data from a host computer 31 in the expanded memory field EZ according to the parameter from a system controller 29 is outputted to a system controller 29. In and the parameter from a system controller 29 A command output means 82 to output the reservation discharge command from the extended transfer-

request means 81 ** host computer 31 which responds and transmits the data of the expanded memory field EZ to a host computer 31 to a system controller 29 [0088] And in step S3 in the flow chart of drawing 5 , distinction of whether whether there having been any demand from a host computer 31 and a command were inputted through the distinction means 72 is performed. Distinction at this step S3 is performed until the command from a host computer 31 is inputted, and it serves as waiting for command input.
[0089] When a command is inputted, it progresses to the following step S4 and the command from a host computer 31 is stored in reception and the command storing field of a data RAM 53 through the command receipt means 73. Next, in step S5, the interrupt signal which shows having received the command to a system controller 29 is outputted through the interrupt signal output means 74.
[0090] Next, it goes into the various demand processing subroutines (various demand processing means) 75 in step S6. These various demand processing subroutines 75 embrace the contents of directions of the inputted command, as shown in drawing 6 . A reservation demand to an extended write request The subroutine which corresponds, respectively, Namely, a reservation demand subroutine S101, a read-out demand subroutine (Reservation demand means 76) S102, an extended read-out demand subroutine (Read-out demand means 77) It goes into S103, the block transfer-request subroutine (block transfer-request means 79) S104, the extended write request subroutine (extended write request means 80) S105, and the extended transfer-request subroutine (extended transfer-request means 81) S106. (Extended read-out demand means 78) When it is a reservation discharge demand, it progresses to S107 and this command is outputted to a system controller 29 through the command output means 82.
[0091] Termination of the demand processing according to a command performs distinction of whether the main routine of drawing 5 had a program termination demand through the distinction means 72 in return and the following step S7. This distinction is performed by whether there was any termination demand in for example, the power source OFF, maintenance interruption (carried out when porting a new program under an on-line

environment based on functional extension etc.), etc.

[0092] And in this step S7, when it returns to step S3 and it becomes the waiting for command input again, when there is no above-mentioned termination demand, and there is the above-mentioned termination demand, this data transfer processing program will be completed.

[0093] On the other hand, in a system controller 29, a system check, a memory check, a setup, etc. in the initial actuation 29, for example, a system controller, are performed to coincidence with powering on in step S201 of drawing 9 .

[0094] In step S202 the command from the I/F controller 25 from a program ROM 61 Then, reception, According to this received command, create various tables, and the parameter for supplying the I/F controller 25 further is created. At the same time the command processing program which is a means 91 (refer to drawing 8) to output to the I/F controller 25 is read and it is written in RAM62 for actuation Since the data which set working [the above-mentioned program] and were created are saved temporarily, the working area used for delivery of the variable of each routine which constitutes these programs etc. is assigned in RAM62 for actuation.

[0095] As shown in drawing 8 , the command processing program 91 read to above-mentioned RAM62 for actuation has a distinction means 92 perform various distinction, an initialization processing means 93 initialize the contents, a parameter, etc. of various tables, a command receipt means 94 receive the command from the I/F controller 25, and the various demand processing means 95 that are means for branching the processing according to the inputted command, and is constituted.

[0096] The means alternatively activated according to the above-mentioned command in the various above-mentioned demand processing means 95 is as follows.

[0097] ** Receive the reservation command from the I/F controller 25, receive the read-out command from the reservation processing means 96 ** I/F controller 25 which creates various tables based on this command, and is transmitted to the I/F controller 25, and correct various tables. Furthermore, the extended read-out command from the read-out processing means 97 **

I/F controller 25 which creates the parameter for read-out which has the write-in initiation logical address of the transmit buffer field TZ etc., and is outputted to the I/F controller 25 is received. The block transfer command from the extended read-out processing means 98 ** I/F controller 25 which corrects various tables, creates the parameter for extended read-out which has the write-in initiation logical address of the expanded memory field EZ etc. further, and is outputted to the I/F controller 25 is received. Various tables are corrected. Furthermore, the parameter for block transfer which has the read-out initiation logical address of the transmit buffer field TZ, the write-in initiation logical address of the expanded memory field EZ, etc. is created. The extended write-in command from the block transfer processing means 99 ** I/F controller 25 outputted to the I/F controller 25 is received. The extended transfer command from the extended write-in processing means 100 ** I/F controller 25 which corrects various tables, creates the parameter for extended writing which has the write-in initiation logical address of the expanded memory field EZ etc. further, and is outputted to the I/F controller 25 is received. The reservation discharge command from the extended transfer processing means 101 ** I/F controller 25 which creates the parameter for an extended transfer which has the read-out initiation logical address of the expanded memory field EZ etc., and is outputted to the I/F controller 25 is received. A reservation discharge processing means 102 to make the correction for reservation discharge to various tables [0098] And in step S203 in the flow chart of drawing 9 , various tables and a parameter are initialized through the initialization processing means 93. For example, the EOF (and - OBU file) code is stored in the starting record of a table, and 0 is stored in the storing field of various data.

[0099] Next, in step S204, distinction of whether the interrupt signal was inputted through the distinction means 92 from whether there was any demand from the I/F controller 25 and the I/F controller 25 is performed. Distinction at this step S204 is performed until the interrupt signal from the I/F controller 25 is inputted, and it serves as waiting for an interrupt signal input.

[0100] When an interrupt signal is inputted, it progresses to the following step S205, and the command from the I/F controller 25 is stored in reception and

the command storing field of a data RAM 63 through the command receipt means 94.

[0101] Next, it goes into the various demand processing subroutines (various demand processing means) 95 in step S206. This subroutine 95 embraces the contents of directions of the inputted command, as shown in drawing 10 . The subroutine which corresponds, respectively, Namely, a reservation processing subroutine S301, a read-out processing subroutine (Reservation processing means 96) S302, an extended read-out processing subroutine (Read-out processing means 97) S303, the block transfer processing subroutine (block transfer processing means 99) S304, the extended write-in processing subroutine (extended write-in processing means 100) S305, the extended transfer processing subroutine S306 (extended transfer processing means 101), (Extended read-out processing means 98) It goes into the reservation discharge processing subroutine (reservation discharge processing means 102) S307.

[0102] Termination of the demand processing according to a command performs distinction of whether the main routine of drawing 9 had a program termination demand through the distinction means 92 in return and the following step S207. This distinction is performed by whether there was any termination demand in for example, the power source OFF, maintenance interruption (carried out when porting a new program under an on-line environment based on functional extension etc.), etc.

[0103] And in this step 207, when it returns to step S204 and it becomes the waiting for command input again, when there is no above-mentioned termination demand, and there is the above-mentioned termination demand, this data transfer processing program 91 will be completed.

[0104] Next, actuation of the I/F controller 25 and system controller 29 according to each command from a host computer 31 is explained below.

[0105] [reservation processing of an expanded memory field] -- first, when a reservation command is inputted into the I/F controller 25 from a host computer 31, it goes into a reservation demand subroutine (reservation demand means 76) from the various demand processing subroutines 75.

[0106] As shown in drawing 11 , this reservation demand means 76 has a

distinction means 111 to perform various distinction, a command output means 112 to output a command to a system controller 29, and various table receipt means 113 to receive the various tables transmitted from a system controller 29, and is constituted.

[0107] And this reservation demand means 75 outputs first the reservation command data stored in the command storing field to a system controller 29 through the command output means 112 in step S401 of drawing 12 .

[0108] In a system controller 29, when the reservation command data from the I/F controller 25 are inputted, it goes into a reservation processing subroutine (reservation processing means 96) from the various demand processing subroutines shown by drawing 10 . Reservation command data consist of the initiation logical address (relative sector address) of the expanded memory field EZ, and the termination logical address (relative sector address) of the expanded memory field EZ.

[0109] A distinction means 121 by which this reservation processing means 96 performs various distinction as shown in drawing 13 , An extended information table creation means 122 to create the extended information table developed by the predetermined field of a data RAM 63, A transfer information table creation means 123 to create the transfer information table developed by another predetermined field of a data RAM 63, It has a table transfer means 124 to transmit the extended information table and transfer information table which were created with each information table creation means 122 and 123 to the I/F controller 25, and is constituted.

[0110] Moreover, the table read-out means 125 and the EOF code storing means 126 which this reservation processing means 96 is activated with the others and extended information table creation means 122 or the transfer information table means 123, [means / above-mentioned / various] The table buffer storing means 127 activated only with the extended information table creation means 122, the set-bit processing means 128, the renewal means 129 of the number of residual sectors, and the record migration means 130, It has the address storing means 131 activated only with the transfer information table creation means 123.

[0111] The above-mentioned table read-out means 125 is a means which

reads an extended information table or one record of transfer information tables at a time, respectively, and the above-mentioned EOF code storing means 126 is a means to store the EOF code in the last record of each information table. Moreover, the above-mentioned table buffer storing means 127 It is a means to store in the applicable record of an extended information table the table buffer developed by the data RAM 63. The above-mentioned set-bit processing means 128 It is the means which carries out set-bit processing of the directions information bit of the applicable record of an extended information table. The above-mentioned renewal means 129 of the number of residual sectors Renewal of the number of sectors of the expanded memory field EZ which increases by expansion of the expanded memory field EZ based on reservation of + is done. Or the number of sectors of the transmit buffer field TZ which decrease in number by expansion of the expanded memory field EZ based on reservation - It is a means for updating. The above-mentioned record migration means 130 It is the means to which the record group after the applicable record of an extended information table is moved so that it may begin from a predetermined record.

[0112] Here, as an extended information table is shown in drawing 54 (a), it has a record according to a divisor beforehand, and is constituted, and it is the directions information bit which shows whether they are whether the contents of one record have the 1st reserved bit of the beginning, and reservation discharge, and 1 / 0= reserved / reservation discharge is shown. Moreover, the field where the initiation logical address (relative sector address) and the termination logical address (relative sector address) other than the above-mentioned directions information bit are stored is assigned to this record.

[0113] On the other hand, as a transfer information table is shown in drawing 54 (b), beforehand, it is the same as a divisor, or it has the record according to the number of **1 of the expanded memory field EZ, and is constituted, and, as for the contents of one record, the field where the initiation logical address (relative sector address) and the termination logical address (relative sector address) are stored is assigned.

[0114] And this reservation processing means 96 develops first the command

data stored in the command storing field to a table buffer in step S501 of drawing 14 . This table buffer is the same as the configuration of one record of the extended information table shown by drawing 54 (a), at this step S501, stores command data (initiation logic address data and termination logic address data) according to the array sequence of one record of an extended information table, and sets a reserved bit further.

[0115] Next, it goes into an extended information table creation subroutine (extended information table creation means) in step S502. This subroutine stores a value "0" in Initialization i, i.e., an index register, for the index register i used as the record read-out index of an extended information table in step S601 first, as shown in drawing 15 . Moreover, "0" is stored in the information flag shown by drawing 54 (c). The 1st bit of the beginning is the EOF code demand flag, and the following bit [2nd] of this information flag is a table change-request flag.

[0116] Next, in step S602, the record of the number shown with an index register i is read from an extended information table through the table read-out means 125. That is, the record of i record eye is read from an extended information table. Next, in step S603, it is distinguished through the distinction means 121 whether the contents of the record of the above-mentioned i record eye are the EOF codes.

[0117] When the contents of the i record eye are not the EOF codes, it progresses to the following step S604, and it is distinguished for record migration through the distinction means 121 whether it is the need. This distinction is performed by whether it is smaller than the initiation logical address with which the initiation logical address concerning this reservation stored in the table buffer is stored in the record of i record eye.

[0118] When the initiation logical address concerning this reservation is smaller than the initiation logical address concerning i record eye, it progresses to the following step S605, and the record group after i record eye is moved among an extended information table through the record migration means 130 after a record (i+1).

[0119] Next, in step S606, this table buffer is stored in i record eye of an extended information table through the table buffer storing means 127. Next,

in step S607, "1" is set to a table modification flag among information flags.
[0120] On the other hand, it is distinguished whether it is the same as the initiation logical address which requires for i record eye the initiation logical address which progresses to step S608 and starts this reservation shortly through the distinction means 121 rather than the initiation logical address which requires for i record eye the initiation logical address which starts this reservation in the above-mentioned step S604 when it is not smallness. If the addresses are the same, it will progress to the following step S609, and it will be shortly distinguished through the distinction means 121 whether it is the same as the termination logical address which requires the termination logical address concerning this reservation for i record eye.
[0121] When it progresses to step S606 when the addresses are not the same, and processing after step S606 is performed and the addresses are in agreement, it progresses to step S610 and "1" is set to the directions information bit concerning i record eye of an extended information table through the set-bit processing means 128. That is, the field from the initiation logical address stored in i record eye to the termination logical address is registered as reserved among the expanded memory field EZ.
[0122] In the above-mentioned step S608, when the initiation logical address concerning this reservation is not the same as the initiation logical address concerning i record eye, it progresses to step S611 and index register +1 renewal of i is performed. Then, it returns to step S602, the next record of an extended information table is read, and the processing after step S603 is repeated.
[0123] Moreover, in the above-mentioned step S603, when the contents of the i record eye are the EOF codes, after progressing to step S612 and setting "1" to the EOF code demand flag among information flags, it progresses to step S606 and processing after this step S606 is performed.
[0124] After processing of step S607 or step S610 is completed, it progresses to step S613 and it is distinguished among an information flag through the distinction means 121 whether the EOF code demand flag is "1."
[0125] When the EOF code demand flag is "1", it progresses to the following step S614, and the EOF code is stored in the record (i+1) eye of an extended

information table through the EOF code storing means 126. Next, in step S615, renewal of the number of reservation sectors of the expanded memory field EZ of + is done through the renewal means 129 of the number of reservation sectors. The value which specifically deducted (the reservation initiation logical address -1) from the termination logical address concerning this reservation is added with the value stored in the number storing field of reservation sectors assigned to the data RAM 63, and it is carried out by storing in this number storing field of reservation sectors.

[0126] Next, in step S616, the renewal means 129 of the number of residual sectors is led, and it is the number of residual sectors of the transmit buffer field TZ. - It updates. It is carried out by storing the value which specifically deducted the number of reservation sectors for which it asked at the above-mentioned step S615 from the total number of sectors of a data buffer in the number storing field of residual sectors currently assigned to the data RAM 63.

[0127] In addition, in the above-mentioned step S613, when the EOF code demand flag is "0", it progresses to the direct above-mentioned step S615, and processing after this step S615 is performed. And when processing of the above-mentioned step S616 is completed, this extended information table creation subroutine 122 is completed.

[0128] After returning to the main routine of drawing 14 and completing the extended information table creation subroutine 122 in the above-mentioned step S502, it progresses to the following step S503, and it is distinguished among an information flag through the distinction means 121 whether a table change-request flag is "1."

[0129] When a table change-request flag is "1", it progresses to the following step S504, and goes into the transfer information table creation subroutine 123 shortly. This subroutine first initializes the index register k which is the index which shows the index register i which is the record read-out index of an extended information table, the index register j which is the record read-out index of a transfer information table, and the count of a routine in step S701, respectively, as shown in drawing 16 . That is, initial value "0" is stored in each index registers i, j, and k, respectively.

[0130] Next, in step S702, the record of the number shown with an index

register i is read from an extended information table through the table read-out means 125. That is, the record of i record eye is read from an extended information table. Next, in step S703, it is distinguished through the distinction means 121 whether the contents of the record of the above-mentioned i record eye are the EOF codes.

[0131] When the contents of the i record eye are not the EOF codes, it progresses to the following step S704, and it is distinguished through the distinction means 121 whether i record eye is reserved. As for this distinction, the directions information bit of i record eye is performed by "1" and "0."

[0132] When i record eye is reserved, it progresses to the following step S705, and it is shortly distinguished for the value of an index register k through the distinction means 121 whether it is "0." This distinction processing is performed in order to know whether the reservation range of the expanded memory field EZ has begun from logical address =0, and this is because allotment of the transmit buffer field TZ changes by whether the reservation range of the expanded memory field EZ has begun from logical address =0.

[0133] In the above-mentioned step S705, when the value of an index register k is "0", it progresses to the following step S706, and it is distinguished through the distinction means 121 whether the initiation logical address stored in i record eye is "0" shortly. When the above-mentioned initiation logical address is not "0", it progresses to the following step S707, "0" is stored in 0 record eye of a transfer information table as the initiation logical address through the address storing means 131, and the value which subtracted 1 from the initiation logical address concerning i record eye of the extended information table read at the above-mentioned step S702 as the termination logical address is stored.

[0134] next, in step S708, the value which added 1 to the termination logical address concerning i record eye of the extended information table which carried out [above-mentioned] reading appearance to 1 record eye of a transfer information table as the initiation logical address is stored through the address storing means 131. Next, an index register j is amended in step S709. That is, an index register j is updated +one.

[0135] on the other hand, when the initiation logical address stored in i record

eye is "0" in the above-mentioned step S706, it progresses to step S710 and the value which added 1 to the termination logical address concerning i record eye of the extended information table which carried out [above-mentioned] reading appearance to 0 record eye of a transfer information table as the initiation logical address is stored through the address storing means 131.

[0136] Moreover, in the above-mentioned step S705, when the value of an index register k is not "0", it progresses to step S711 and the value which subtracted 1 from the initiation logical address concerning i record eye of the extended information table read to the record (j-1) eye of a transfer information table at the above-mentioned step S702 as the termination logical address is stored through the address storing means 131. next, in step S712, the value which added 1 to the termination logical address concerning i record eye of the extended information table which carried out [above-mentioned] reading appearance to j record eye of a transfer information table as the initiation logical address is stored through the address storing means 131.

[0137] After processing of the above-mentioned step 709, step S710, or step S712 is completed, or after [when i record eye of an extended information table was not reserved in the above-mentioned step S704 and it is distinguished,] progressing to the following step S713 and updating each index registers i, j, and k +one time, respectively, it progresses to step S702 again, the following record is read from an extended information table, and the processing after step S703 is repeated.

[0138] On the other hand, in the above-mentioned step S703, when the contents of the i record eye are the EOF codes, it progresses to step S14 shown by drawing 17 , and a record eye is shortly read from an extended information table through the table read-out means 125 (i-1).

[0139] Next, in step S715, it is distinguished through the distinction means 121 whether the termination logical address stored in the above-mentioned (i-1) record eye is the same as the last logical address of this data buffer 26. When each address is not the same, it progresses to the following step S716, and the last logical address of a data buffer is stored in the record (J-1) eye of a transfer information table as the termination logical address through the address storing means 131. Next, in step S717, the EOF code is stored in j

record eye of a transfer information table through the EOF code storing means 126.

[0140] On the other hand, when the termination logical address stored in the above-mentioned (i-1) record eye and the last logical address of this data buffer are in agreement in the above-mentioned step S715, it progresses to step S718 and the EOF code is stored in the record (j-1) eye of a transfer information table through the EOF code storing means 126.

[0141] And when these steps S717 or step S718 is completed, this transfer information table creation subroutine 123 is completed.

[0142] Return to the main routine of drawing 14 , and when the table change-request flag in an information flag is distinguished from "0" in the phase or step S503 which the transfer information table creation subroutine 123 in the above-mentioned step S504 ended, it progresses to the following step S505. Through the table transfer means 124, an extended information table and a transfer information table are transmitted, this reservation processing subroutine 96 is completed to an I/F controller, and the various demand processing subroutines 95 shown in coincidence by drawing 8 are completed.

[0143] After returning to the reservation demand subroutine 75 of drawing 12 in the I/F controller 25 and completing the output of the command data to the system controller 29 by the command output means 112 in step S401 again, it progresses to the following step S402. In this step S402, it is distinguished from a system controller 29 through the distinction means 111 whether various information tables were transmitted. That is, it becomes the waiting for a table transfer.

[0144] If various information tables are transmitted from a system controller 29, it progresses to the following step S403, and various information tables (namely, an extended information table and a transfer information table) are stored in the table storing field to which it corresponds in a data RAM 53, respectively through the various table receipt means 113. The reservation demand subroutine 76 is completed at this time, and the various demand processing subroutines 75 are also ended to coincidence.

[0145] When a read-out command is inputted into the I/F controller 25 from [data transfer processing which goes via a transmit buffer field], next a host

computer 31, it goes into the read-out demand subroutine (read-out demand means) 77 from the various demand processing subroutines 75.

[0146] A distinction means 141 by which this read-out demand means 77 performs various distinction as shown in drawing 18 , A command output means 142 to output a command to a system controller 29, A parameter receipt means 143 to receive the parameter for read-out transmitted from a system controller 29, An are recording demand means 144 to store the ROM data Dr sent from a decoder 24 in the transmit buffer field TZ, To a transfer-request processing means 145 to transmit the ROM data Dr stored in the transmit buffer field TZ to a host computer 31, and the system controller 29, processing has a completion signal output means 146 to tell, alias ********, and is constituted.

[0147] Moreover, this read-out demand means 77 has the table read-out means 147 and the parameter creation means 148 which are activated with the others and are-recording demand processing means 144 or the transfer-request processing means 145, the playback data read-in means 149 and the playback data write-in means 150 which are activated only with an are-recording demand processing means 144, and the data-readout means 151 and the data-transfer means 152 which are activated only with a transfer-request processing means 145. [means / above-mentioned / various]

[0148] The table read-out means 147 is a means which reads one record of transfer information tables at a time, and the parameter creation means 148 is a means to transmit to a system controller 29 by making into a parameter the ending address of the data which had the are recording demand this time. Moreover, the playback data read in means 149 is a means to store in the working area which read the ROM data Dr from the decoder 24 supplied through input port 54 per 1 sector, and was assigned to RAM52 for actuation, or a data RAM 53, and the playback data write-in means 150 is a means which writes the playback data stored in the above-mentioned working area in the transmit buffer field TZ per 1 sector. Moreover, the data readout means 151 is a means to store in the working area which read the are recording data from the transmit buffer field TZ supplied through input port 54 per 1 sector, and was assigned to RAM52 for actuation, or a data RAM 53, and the data

transfer means 152 is a means to transmit the are recording data stored in the above-mentioned working area to a host computer 31 per 1 sector.
[0149] And this read-out demand means 77 outputs first the read-out command data stored in the command storing field to a system controller 29 through the command output means 142 in step S801 of drawing 19 .
[0150] In a system controller 29, when the read-out command data from the I/F controller 25 are inputted, it goes into the read-out processing subroutine (read-out processing means 97) S302 from the various demand processing subroutines shown by drawing 10 . Read-out command data consist of the address and its number of sectors on optical disk D which should read data.
[0151] A distinction means 161 by which this read-out processing means 97 performs various distinction as shown in drawing 22 , The parameter receipt means 162 for receiving the parameter from the I/F controller 25 which can be sent through input port 64, The address information read-out means 163 for reading the ROM-address information Dar from the decoder 24 which can be sent through input port 64, The table read-out means 164 which reads the transfer information table or transfer storing table developed by the predetermined field of a data RAM 63 per 1 record, respectively, A parameter creation means 165 to create the parameter for a transfer for requiring the data transfer to the parameter for read-out and host computer 31 for requiring read-out of data, and to transmit to the I/F controller 25 or the mechanism controller 28, respectively, A logical address decision means 166 to determine the initiation logical address of the transmit buffer field TZ which should store the ROM data Dr, A transfer storing table creation means 167 to create a transfer storing table based on the parameter from this command data and I/F controller 25, It has a demand output means 168 to output the signal for directing various demands to the I/F controller 25, and is constituted.
[0152] Moreover, it activates with the logical address decision means 166 besides the various above-mentioned means, and this read-out processing means 97 is the number of sectors of the transmit buffer field TZ. - The renewal means 169 of the number of residual sectors for updating, The effective-bits resetting means 170 for activating with the transfer storing table creation means 167, and resetting the effective bits of the applicable record in

a transfer storing table, It has the table buffer storing means 171 for storing in the applicable record of a transfer storing table the table buffer with which these command data were developed, and the EOF code storing processing means 172 for storing the EOF code in the applicable record of a transfer storing table.

[0153] or [that consist of many records and the record concerned of the 1st bit of the beginning is / the contents of one record / effective here as a transfer storing table is shown in drawing 55 (b)] -- it is the directions information bit which shows whether it is an invalid, and 1 / 0= effective / invalid is shown. Moreover, the field where the address on the optical disk for read-out, the initiation logical address on a transmit buffer field (relative sector address), the termination logical address (relative sector address), the correspondence record count of a transfer information table, and the number of sectors for read-out other than the above-mentioned directions information bit are stored is assigned to this record.

[0154] And this read-out processing means 97 develops first the command data stored in the command storing field to a table buffer in the step SB 01 of drawing 23 . This table buffer is the same as the configuration of one record of the transfer storing table shown by drawing 55 (b), and stores command data (the address and the number of sectors on an optical disk) at this step SB 01 according to the array sequence of one record of a transfer storing table.

[0155] Next, in a step SB 02, the index register i used as the record read-out index of a transfer storing table is initialized. That is, initial value "0" is stored in an index register i.

[0156] Next, in a step SB 03, the record of the number shown with an index register i is read from a transfer storing table through the table read-out means 164. That is, the record of i record eye is read from a transfer storing table. Next, in a step SB 04, it is distinguished through the distinction means 161 whether the contents of the record of the above-mentioned i record eye are the EOF codes. or [that progress to the following step SB 05 and the contents of the i record eye are effective through the distinction means 161 when the contents of the i record eye are not the EOF codes] -- it is distinguished whether it is an invalid. This distinction is performed to the first

bit [1st] of i record eye by whether it is "1" and "0."

[0157] When effective, it progresses to the following step SB 06, and it is distinguished whether the address on optical disk D which had the demand this time, and the address on optical disk D registered into i record eye are in agreement through the distinction means 161. When in agreement, it progresses to the following step SB 07, and it is distinguished through the distinction means 161 whether it is below the number of sectors with which the number of sectors which had the demand this time is registered into i record eye.

[0158] When this number of sectors is below the number of registered sectors, it progresses to the following step SB 08, and the parameter for a transfer is created through the parameter creation means 165. Specifically, the number of sectors of a demand is stored in the parameter storing field assigned to the data RAM 63 the initiation logical address on the transmit buffer field TZ concerning i record eye of a transfer storing table, the record count corresponding to a transfer information table, and this time.

[0159] In the above-mentioned step SB 06 when the number of sectors of a demand was larger than the number of registered sectors this time and it is distinguished in the above-mentioned step SB 07 on the other hand When it is distinguished that the address and the registration address on optical disk D of a demand are inharmonious this time, or when the contents of the i record eye are distinguished in the above-mentioned step SB 05 as it is invalid, it progresses to a step SB 09 and renewal of + of an index register i is performed. Then, the next record of return and a transfer storing table is read to the above-mentioned step SB 03, and the processing after a step SB 04 is repeated.

[0160] Moreover, in the above-mentioned step SB 04, when it is distinguished that the contents of the i record eye are the EOF codes, it progresses to the step SB 10 of drawing 24 , and goes into the logical address decision subroutine (logical address decision means) 166. As this logical address decision subroutine 166 is shown in drawing 25 , in a step SC 01, it is first distinguished for the number of sectors of a demand through the distinction means 161 this time whether it is below the number of residual sectors of the

transmit buffer field TZ. This distinction is performed by comparing the number of sectors of a demand the value in the number storing field of residual sectors currently assigned to the data RAM 63, and this time.

[0161] When the number of sectors of a demand is below the number of residual sectors this time, it progresses to the following step SC 02, and the value which added 1 to the index register j in the last termination logical address is stored. The value which added 1 to the termination logical address accompanying the data accumulation to the transmit buffer field TZ sent from the I/F controller last time specifically stored in the ending-address storing field currently assigned to the data RAM is stored in an index register j.

[0162] Next, in a step SC 03, the renewal means 169 of the number of residual sectors is led, and it is the number of residual sectors of the transmit buffer field TZ. - It updates. It is carried out by storing again in the number storing field of residual sectors the value which specifically deducted the number of sectors of a demand from the value stored in current and the number storing field of residual sectors this time.

[0163] Next, in a step SC 04, the index register k used as each record read-out index of a transfer information table and an extended information table is initialized. That is, initial value "0" is stored in an index register k. Next, in a step SC 05, the record of the number shown with an index register k is read from a transfer information table through the table read-out means 164. That is, the record of k record eye is read from a transfer information table.

[0164] Next, in a step SC 06, the record of the number shown with an index register k is read from an extended information table through the table read-out means 164. That is, the record of k record eye is read from an extended information table.

[0165] Next, in a step SC 07, it is distinguished through the distinction means 161 whether the value of an index register j is between the initiation logical address of k record eye in a transfer information table and the termination logical address. When the value of an index register j is between the initiation logical address and the termination logical address, it progresses to the following step SC 08, the value of an index register j is stored in Register ADD, and the value of an index register k is stored in Register RCD.

[0166] On the other hand, when there is no value of an index register j between the initiation logical address and the termination logical address in the above-mentioned step SC 07, it progresses to a step SC 09 and it is distinguished whether the value of an index register j is between the initiation logical address of k record eye in an extended information table and the termination logical address shortly through the distinction means 161. When the value of an index register j is between the initiation logical address and the termination logical address, it progresses to the following step SC 10, the value which added 1 to Register ADD in the above-mentioned termination logical address is stored, and the value which added 1 to Register RCD at the value of an index register k is stored.

[0167] In the above-mentioned step SC 09, when there is no value of an index register j between the initiation logical address of k record eye in an extended information table, and the termination logical address, it progresses to a step SC 11 and index register +1 renewal of k is performed. Then, it progresses to the above-mentioned step SC 05, and the processing after this step SC 05 is repeated.

[0168] On the other hand, in the above-mentioned step SC 01, when the number of sectors of a demand was not below the number of residual sectors of the transmit buffer field TZ this time and it is distinguished, it progresses to a step SC 12 and 0 record eye of a transfer information table is read through the table read-out means 164. And the starting address of this 0 record eye is stored in Register ADD, and 0 is stored in Register RCD. Next, the number of residual sectors is made into max in a step SC 13. Specifically, the value which deducted the number of reservation sectors from the total number of sectors of a data buffer 26 is stored in the number storing field of residual sectors.

[0169] And this logical address decision subroutine 166 is completed in the phase which processing at the above-mentioned step SC 08, processing at the above-mentioned step SC 10, or processing at the above-mentioned step SC 13 ended.

[0170] It returns to the main routine of drawing 24 , and in the phase which the logical address decision subroutine in the above-mentioned step SB 10 ended,

it progresses to the following step SB 11, and the parameter for read-out which should be transmitted to the mechanism controller 28 is created through the parameter creation means 165. It is carried out by specifically storing the address on optical disk D of a demand in the read-out parameter storing field for mechanisms assigned to the data RAM 63 this time which is stored in the table buffer.

[0171] Next, in a step SB 12, the parameter for read-out which should be transmitted to the I/F controller 25 is created through the parameter creation means 165. Specifically, it is carried out this initiation logical address stored in Register ADD to the read-out parameter storing field for I/F assigned to the data RAM 63, this record count (record count of a transfer information table) stored in Register RCD, and by storing the number of sectors of a demand this time which is stored in the table buffer.

[0172] Next, in a step SB 13, a read-out demand signal and the parameter for read-out stored in the read-out parameter storing field for mechanisms are outputted to the mechanism controller 28 through the parameter creation means 165. Moreover, the parameter for read-out stored in coincidence to the I/F controller 25 to the read-out demand signal and the read-out parameter storing field for I/F is outputted.

[0173] Here, the mechanism controller 28 is conveyed to the truck location corresponding to the address which carried out drive control of the sliding mechanism 7 for optical pickups, and had the demand of an optical pickup 3, after taking out the address on optical disk D from the parameter for read-out based on the input of the read-out demand signal from a system controller 29. The mechanism controller 28 is controlled in this phase to permit the input of a detecting signal Sr to the RF amplifier section 21. The detecting signal Sr from the photodetector in an optical pickup 3 will be inputted into a demodulator circuit 22 through the RF amplifier section 21 by this, will be supplied to a decoder 24 as playback data Di, and will be further supplied to the I/F controller 25 as ROM data Dr.

[0174] On the other hand, the ROM-address information Dar corresponding to the above-mentioned ROM data Dr is acquired from a decoder 24, and this ROM-address information Dar is supplied to a system controller 29.

[0175] And a system controller 29 receives the ROM-address information Dar from the decoder 24 sent through input port 64 through the address information read-out means 163 in the step SB 14 in drawing 24 .
[0176] Next, in a step SB 15, it is distinguished whether the address on optical disk D of a demand is in agreement through the distinction means 161 the address received through the above-mentioned address information read-out means 163 and this time. A step SB 14 and a step SB 15 are repeated until these addresses are in agreement.
[0177] When the addresses are in agreement, it progresses to the following step SB 16, and an are recording demand signal is outputted to the I/F controller 25 through the demand output means 168. The I/F controller 25 stores the ROM data Dr from a decoder 24 per sector one by one from the initiation logical address determined this time among the transmit buffer field TZ based on the input of this are recording demand signal. And the completion signal of are recording is outputted to a system controller 29 in the phase where the demanded ROM data Dr for several sector minutes were stored. The detail about this actuation is mentioned later.
[0178] After outputting an are recording demand signal to the manipulation routine of drawing 24 at return and the above-mentioned step SB 16, it progresses to the following step SB 17, and waits for the input of the completion signal of are recording from the I/F controller 25. It progresses to the following step SB 18 in the phase where the completion signal of are recording was inputted from the I/F controller 25, and a deactivate-request signal is outputted to the mechanism controller 28 through the demand output means 168. The mechanism controller 28 controls various circuits to suspend the playback actuation to optical disk D based on the input of the deactivate-request signal from a system controller 29.
[0179] Next, in a step SB 19, the parameter for a transfer is shortly created through the parameter creation means 165. The number of sectors of a demand is stored the initiation logical address specifically determined as the parameter storing field assigned to the data RAM 63 this time, record count, and this time.
[0180] Next, in a step SB 20, a transfer-request signal and the parameter for a

transfer stored in the parameter storing field are outputted to the I/F controller 25 through the parameter creation means 165. Processing at this step SB 20 will be performed after ending the step SB 08 shown by drawing 23 besides after ending processing of the above-mentioned step SB 19.

[0181] Here, based on the input of the transfer-request signal from a system controller 29, among the transmit buffer field TZ, the I/F controller 25 reads the ROM data Dr from the initiation logical address stored in the parameter for a transfer one by one, and transmits them to a host computer 31 side. And the completion signal of a transfer is outputted to a system controller 29 in the phase where the demanded ROM data Dr for several sector minutes were transmitted to the host computer 31 side, and a parameter is outputted further. The detail of this actuation is mentioned later.

[0182] After outputting a transfer-request signal to the manipulation routine of drawing 24 at return and the above-mentioned step SB 20, it progresses to the following step SB 21, and waits for the input of the completion signal of a transfer from the I/F controller 25. It progresses to the following step SB 22 in the phase where the completion signal of a transfer was inputted from the I/F controller 25, and the parameter from the I/F controller 25 supplied through input port 64 is stored in the ending-address storing field currently assigned to the receipt and the data RAM 63 through the parameter receipt means 162. The contents of this parameter are the termination logical address of the ROM data Dr stored in the transmit buffer field TZ this time.

[0183] Next, it goes into a transfer storing table creation subroutine (transfer storing table creation means 167) in a step SB 23. This subroutine initializes the index register i used as the record read-out index of a transfer storing table in a step SD 01 first, as shown in drawing 26 . That is, initial value "0" is stored in an index register i.

[0184] Next, in a step SD 02, this termination logical address stored in Register EAD to the ending-address storing field is stored. Next, in a step SD 03, the record of the number shown with an index register i is read from a transfer storing table through the table read-out means 164. That is, the record of i record eye is read from a transfer storing table.

[0185] Next, in a step SD 04, it is distinguished through the distinction means

161 whether the contents of the record of the above-mentioned i record eye are the EOF codes. or [that progress to the following step SD 05 and the contents of the i record eye are shortly effective through the distinction means 161 when the contents of the i record eye are not the EOF codes] -- it is distinguished whether it is an invalid. This distinction is performed to the first bit [1st] of i record eye by whether it is "1" and "0."

[0186] When effective, it progresses to the following step SD 06, and the initiation logical address and the termination logical address are read from i record eye of a transfer storing table. Next, in a step SD 07, it is distinguished through the distinction means 161 whether the initiation logical address concerning the above-mentioned i record eye is smaller than the initiation logical address of the data stored this time, or larger than the termination logical address.

[0187] It is distinguished whether the initiation logical address of the above-mentioned i record eye is smaller than the initiation logical address of data, or it is smaller than the initiation logical address of the data which the termination logical address which progresses to the following step SD 08 and starts the above-mentioned i record eye shortly through the distinction means 161 stored this time when larger than the termination logical address, or larger than the termination logical address.

[0188] It is smaller than the initiation logical address of data, or when larger than the termination logical address, the initiation logical address of the above-mentioned i record eye progresses to the following step SD 09, and updates an index register i +one. Then, it returns to the above-mentioned step SD 03, the following record in a transfer storing table is read, and the processing after a step SD 04 is repeated.

[0189] In the above-mentioned step SD 08 when the initiation logical address concerning the above-mentioned i record eye was between the initiation logical address of the data stored this time, and the termination logical address and it is distinguished in the above-mentioned step SD 07 on the other hand When the termination logical address concerning the above-mentioned i record eye was between the initiation logical address of the data stored this time, and the termination logical address and it is distinguished It

progresses to a step SD 10, the effective bits in i record eye of a transfer storing table are reset through the effective-bits resetting means 170, and the record concerned is made into an invalid.

[0190] And in the phase which processing at the above-mentioned step SD 10 ended, or the above-mentioned step SD 05, when the contents of the i record eye of a transfer storing table are distinguished as it is invalid, or when it is distinguished in the above-mentioned step SD 04 that the contents of the record of i record eye of a transfer storing table are the EOF codes, it progresses to the following step SD 11.

[0191] Predetermined data are stored in a table buffer in this step SD 11. The address and the number of sectors on optical disk D which had the demand this time specifically Since storing processing has already been carried out at the step SB 01 shown by drawing 23 , other data, To namely, the register ADD The correspondence record count of the transfer information table stored in the initiation logical address of the transmit buffer field TZ determined this time stored, the termination logical address of the data stored in the transmit buffer field TZ this time stored in Register EAD, and Register RCD According to the array sequence of one record of a transfer storing table, it is stored, respectively.

[0192] Next, a table buffer is stored in i record eye of a transfer storing table in a step SD 12. And it goes into the EOF code storing processing subroutine (EOF code storing processing means) 172 in the following step SD 13.

[0193] This subroutine initializes the index registers i, j, and k used as the record read-out index of a transfer storing table in a step SE 01 first, respectively, as shown in drawing 27 . That is, initial value "0" is stored in each index registers i, j, and k, respectively.

[0194] Next, in a step SE 02, the record of the number shown with an index register i is read from a transfer storing table through the table read-out means 164. That is, the record of i record eye is read from a transfer storing table. Next, in a step SE 03, it is distinguished through the distinction means 161 whether the contents of the record of the above-mentioned i record eye are the EOF codes.

[0195] or [that progress to the following step SE 04 and the contents of the i

record eye are effective through the distinction means 161 when the contents of the i record eye are not the EOF codes] -- it is distinguished whether it is an invalid. This distinction is performed to the first bit [1st] of i record eye by whether it is "1" and "0."

[0196] When effective, it progresses to the following step SE 05, and the value which added 1 to the value adding the value of an index register k and the value of an index register j is stored in an index register k. Next, an index register j is initialized in a step SE 06. That is, initial value "0" is stored in an index register j.

[0197] On the other hand, when the contents of the i record eye of a transfer storing table are distinguished in the above-mentioned step SE 04 as it is invalid, it progresses to a step SE 07 and an index register j is updated +one.

[0198] And it progresses to the following step SE 08 in the phase which processing at the above-mentioned step SE 06 or processing at the above-mentioned step SE 07 ended, and an index register i is updated +one. Then, it returns to the above-mentioned step SE 02, the following record in a transfer storing table is read, and the processing after a step SE 03 is repeated.

[0199] On the other hand, in the above-mentioned step SE 03, when it is distinguished that the contents of the i record eye of a transfer storing table are the EOF codes, it progresses to a step SE 09 and the EOF code is stored in k record eye and the record (k+1) eye of a transfer storing table, respectively. This EOF code storing processing subroutine 172 is completed in the phase which processing at this step SE 09 ended.

[0200] And it returns to the manipulation routine of drawing 26 , and this transfer storing table creation subroutine is completed in the phase which the above-mentioned step SD 13 ended. Moreover, it returns to the main routine of drawing 24 , this read-out processing subroutine is completed in the phase which the transfer storing table creation subroutine in the above-mentioned step SB 23 ended, and the various demand processing subroutines shown in coincidence by drawing 10 are completed.

[0201] After returning to the read-out demand subroutine of drawing 19 in the I/F controller 25 and completing the output of the command data to the system controller 29 by the command output means 142 in step S801 again, it

progresses to the following step S802.

[0202] In this step S802, it is distinguished from a system controller 29 through the distinction means 141 whether there was any input of a demand signal. That is, it becomes the waiting for a demand signal input. If a demand signal is inputted from a system controller 29, it will progress to the following step S803, and it will be distinguished through the distinction means 141 whether the demand signal inputted from the system controller 29 is a read-out demand signal shortly.

[0203] When it is a read-out demand signal, it progresses to the following step S804, and stores in the parameter storing field which receives the parameter for read-out supplied through input port 54 through the parameter receipt means 143, and is assigned to the data RAM 53. The initiation logical address of the transmit buffer field TZ and the correspondence record count of a transfer information table which should store data, and the number of sectors will be stored in this parameter storing field by this.

[0204] Next, in step S805, it becomes the input waiting of the are recording demand signal from a system controller 29 through the distinction means 141. When there is an input of an are recording demand signal from a system controller 29, it progresses to the following step S806, and goes into the are recording demand processing subroutine (are recording demand processing means) 144. This subroutine stores in an index register k the record count which stores initial value "0" in an index register i, and is first stored further in the parameter storing field in step S901, as shown in drawing 20 .

[0205] Next, in step S902, the record of the number shown with an index register k is read from a transfer information table through the table read-out means 147. That is, the record of k record eye is read from a transfer information table.

[0206] Next, in step S903, the ROM data (one sector) Dr from the decoder 24 supplied through input port 54 are read through the playback data read in means 149. Next, in step S904, the address for storing ROM data in a transmit buffer field is calculated. Specifically, it stores in an index register j by making the value adding the value of an index register j, and the value of an index register i into the are recording address.

[0207] Next, in step S905, it is distinguished through the distinction means 141 whether the write-in object domain of the data stored this time is except the transmit buffer field TZ (namely, expanded memory field EZ). This distinction is performed by whether the value of an index register j is larger than the termination logical address in k record eye of a transfer information table. The value of an index register j is larger than the above-mentioned termination logical address, when the write-in object domain of the data stored this time is except the transmit buffer field TZ, it progresses to the following step S906, and an index register k is updated +one.

[0208] Next, in step S907, through the table read-out means 147, k record eye of a transfer information table is read, and the initiation logical address concerning this k record eye is stored in an index register j.

[0209] When it is the phase which processing at the above-mentioned step S907 ended, or below the termination logical address that requires the value of an index register j for k record eye of a transfer information table in the above-mentioned step S905, it progresses to the following step S908, and it writes in the logical address of the transmit buffer field TZ where the value of an index register j shows the ROM data (one sector) read at step S903 through the playback data write-in means 150.

[0210] Next, in step S909, an index register i is updated +one. Next, in step S910, it is distinguished through the distinction means 141 whether it is more than the number of sectors with which the value of an index register i is stored in the parameter storing field. When the value of an index register i is smaller than the number of sectors, it progresses to the above-mentioned step S903, the following ROM data (one sector) are read, and the processing after step S904 is repeated.

[0211] On the other hand, when the value of the above-mentioned index register i becomes more than the number of sectors, it progresses to the following step S911, and the value (termination logical address) of an index register j is stored in an ending-address parameter storing field through the parameter creation means 148. And this are recording demand processing subroutine 144 is completed in the phase which processing at this step S911 ended.

[0212] It returns to the main routine of drawing 19 , and in the phase which the are recording demand processing subroutine 144 in the above-mentioned step S806 ended, it progresses to the following step S807, and the completion signal of are recording is outputted to a system controller 29 through the completion signal output means 146.

[0213] Next, in step S808, it is distinguished from a system controller 29 through the distinction means 141 whether there was any input of a transfer-request signal. That is, it becomes the waiting for a transfer-request signal input.

[0214] In this step S808, if a transfer-request signal is inputted from a system controller 29, or when it was not a read-out demand in the above-mentioned step S803 and is distinguished, it stores in the parameter storing field which progresses to the following step S809, receives the parameter for a transfer supplied through input port 54 through the parameter receipt means 143, and is assigned to the data RAM 53. The initiation logical address of the transmit buffer field TZ and the correspondence record count of a transfer information table in which the data which should be transmitted this time are stored, and the number of sectors will be stored in this parameter storing field by this.

[0215] Next, it goes into the transfer-request processing subroutine (transfer-request processing means) 145 in step S810. This subroutine stores in an index register k the record count which stores initial value "0" in an index register i, and is first stored further in the parameter storing field in a step SA 01, as shown in drawing 21 .

[0216] Next, in a step SA 02, the record of the number shown with an index register k is read from a transfer information table through the table read-out means 147. That is, the record of k record eye is read from a transfer information table. Next, in a step SA 03, the address which should read data from a transmit buffer field is calculated. Specifically, the value adding the value of an index register j and the value of an index register i is stored in an index register j as the read-out address.

[0217] Next, in a step SA 04, it is distinguished through the distinction means 141 whether the read-out object domain of the data transmitted this time is except the transmit buffer field TZ (namely, expanded memory field EZ). This

distinction is performed by whether the value of an index register j is larger than the termination logical address in k record eye of a transfer information table. The value of an index register j is larger than the above-mentioned termination logical address, when the read-out object domain of the data transmitted this time is except the transmit buffer field TZ, it progresses to the following step SA 05, and an index register k is updated +one.

[0218] Next, in a step SA 07, through the table read-out means 147, k record eye of a transfer information table is read, and the initiation logical address concerning this k record eye is stored in an index register j.

[0219] When it is below the termination logical address that requires the value of an index register j for k record eye of a transfer information table in the phase or the above-mentioned step SA 04 which processing at the above-mentioned step SA 06 ended, it progresses to the following step SA 07, and the ROM data (one sector) stored in the logical address shown with an index register j are read among the transmit buffer field TZ through the data readout means 151.

[0220] Next, in a step SA 08, the ROM data for 1 sector read in the above-mentioned step SA 07 are transmitted to a host computer 31 through the data transfer means 152. Next, in a step SA 09, an index register i is updated +one.

[0221] Next, in a step SA 10, it is distinguished through the distinction means 141 whether it is more than the number of sectors with which the value of an index register i is stored in the parameter storing field. When the value of an index register i is smaller than the number of sectors, it progresses to the above-mentioned step SA 03, the read-out address is updated, and the processing after a step SA 04 is repeated. On the other hand, when the value of the above-mentioned index register i becomes more than the number of sectors, this transfer-request processing subroutine 145 is completed.

[0222] It returns to the main routine of drawing 19 , and in the phase which the transfer-request processing subroutine 145 in the above-mentioned step S810 ended, it outputs to a system controller 29 through the parameter creation means 148 by making into a parameter the termination logical address stored in the ending-address parameter storing field at the same time it progresses to the following step S811 and outputs the completion signal of a transfer to a

system controller 29 through the completion signal output means 146.

[0223] This read-out demand subroutine 77 is completed in the phase which processing at the above-mentioned step S811 ended, and the various demand processing subroutines 75 shown in coincidence by drawing 6 are completed.

[0224] When an extended read-out command is inputted into the I/F controller 25 from [data transfer processing which goes via an expanded memory field], next a host computer 31, in drawing 6 , it goes into the extended read-out demand subroutine (extended read-out demand means 78) S103 from the various demand processing subroutines 75.

[0225] A distinction means 181 by which this extended read-out demand means 78 performs various distinction as shown in drawing 28 , A command output means 182 to output a command to a system controller 29, A parameter receipt means 183 to receive the parameter for read-out transmitted from a system controller 29, An are recording demand means 184 to store the ROM data Dr sent from a decoder 24 in the expanded memory field EZ, To a transfer-request processing means 185 to transmit the ROM data Dr stored in the expanded memory field EZ to a host computer 31, and the system controller 29, processing has a completion signal output means 186 to tell, alias ********, and is constituted.

[0226] Moreover, this extended read-out demand means 186 has the playback data read in means 187 and the playback data write-in means 188 which are activated with the are recording demand processing means 184 besides the various above-mentioned means, and the data readout means 189 and the data transfer means 190 which are activated with the transfer-request processing means 185.

[0227] The playback data read in means 187 is a means to store in the working area which read the ROM data Dr from the decoder 24 supplied through input port 54 per 1 sector, and was assigned to RAM52 for actuation, or a data RAM 53, and the playback data write-in means 188 is a means which writes the ROM data Dr stored in the above-mentioned working area in the expanded memory field EZ per 1 sector. Moreover, the data readout means 189 is a means to store in the working area which read the ROM data

Dr from the expanded memory field EZ supplied through input port 54 per 1 sector, and was assigned to RAM52 for actuation, or a data RAM 53, and the data transfer means 190 is a means to transmit the ROM data stored in the above-mentioned working area to a host computer 31 per 1 sector.

[0228] And this extended read-out demand means 78 outputs first the extended read-out command data stored in the command storing field to a system controller 29 through the command output means 182 in the step SF 01 of drawing 29 .

[0229] In a system controller 29, when the extended read-out command data from the I/F controller 25 are inputted, it goes into the extended read-out processing subroutine (extended read-out processing means 98) S303 from the various demand processing subroutines 95 shown by drawing 10 . Read-out command data consist of the address on optical disk D which should read data, the initiation logical address of the expanded memory field EZ which should store the ROM data Dr, and a number of sectors.

[0230] A distinction means 201 by which this extended read-out processing means 98 performs various distinction as shown in drawing 32 , The address information read-out means 202 for reading the ROM-address information Dar from the decoder 24 which can be sent through input port 64, The table read-out means 203 which reads the extended information table or extended storing table developed by the predetermined field of a data RAM 63 per 1 record, respectively, An extended information table retrieval means 204 to search the applicable record of the extended information table which corresponds based on these command data, A parameter creation means 205 to create the parameter for a transfer for requiring the data transfer to the parameter for read-out and host computer 31 for requiring read-out of data, and to transmit to the I/F controller 25 or the mechanism controller 28, respectively, An extended storing table creation means 206 to create an extended storing table based on these command data, The number of reservation sectors which decreases in connection with the data accumulation to the expanded memory field EZ - The renewal means 207 of the number of residual sectors for updating, It has a demand output means 208 to output the signal for directing various demands to the I/F controller 25, and the error

signal output means 209 for outputting an error signal to the I/F controller 25, and is constituted.

[0231] Moreover, it activates with the extended information table retrieval means 204 besides the various above-mentioned means, and this extended read-out processing means 98 has a number count means 210 of sectors to calculate the number of sectors in the expanded memory field EZ for [this] are recording which can be accumulated.

[0232] Here, as an extended storing table is shown in drawing 55 (a), it consists of many records and, as for the contents of one record, the address on the optical disk for read-out, the initiation logical address on an expanded memory field (relative sector address), and the field where the number of sectors is stored are assigned.

[0233] And this extended read-out processing means 98 develops first the command data stored in the command storing field to a table buffer in the step SI 01 of drawing 33 . This table buffer is the same as the configuration of one record of the extended storing table shown by drawing 55 (a), and stores command data (the address on optical disk D, the initiation logical address on the expanded memory field EZ, and the number of sectors) at this step SI 01 according to the array sequence of one record of an extended storing table.

[0234] Next, in a step SI 02, it is distinguished through the distinction means 201 whether at least one ROM data Dr is stored in current and the expanded memory field EZ. This distinction is performed by whether the value stored in the are recording point storing field assigned on the data RAM 63 is "0."

[0235] When the value in the above-mentioned are recording point storing field is not "0", it progresses to the following step SI 03, and the index register i used as the record read-out index of an extended storing table is initialized. That is, initial value "0" is stored in an index register i.

[0236] Next, in a step SI 04, the record of the number shown with an index register i is read from an extended storing table through the table read-out means 203. That is, the record of i record eye is read from an extended storing table.

[0237] Next, in a step SI 05, it is distinguished whether the address on optical disk D which had the demand this time, and the address on optical disk D

registered into i record eye are in agreement through the distinction means 201. When in agreement, it progresses to the following step SI 06, and it is distinguished through the distinction means 201 whether it is below the number of sectors with which the number of sectors which had the demand this time is registered into i record eye.

[0238] When this number of sectors is below the number of registered sectors, it progresses to the following step SI 07, and the parameter for a transfer is created through the parameter creation means 205. Specifically, the number of sectors of a demand is stored in the parameter storing field assigned to the data RAM 63 the initiation logical address on the expanded memory field EZ concerning i record eye of an extended storing table, and this time.

[0239] When the number of sectors of a demand was larger than the number of registered sectors this time and it is distinguished in the above-mentioned step SI 06 on the other hand, or when the address and the registration address on optical disk D of a demand are distinguished in the above-mentioned step SI 05 this time as it is inharmonious, it progresses to a step SI 08 and renewal of + of an index register i is performed.

[0240] Next, in a step SI 09, it is distinguished whether all retrieval of the data stored in the expanded memory field EZ was completed through the distinction means 201. This distinction is performed by whether the value of an index register i is beyond a value in an are recording point storing field. When the value of an index register i is smaller than the value in an are recording point storing field, it returns to the above-mentioned step SI 04, and the processing after read-out and a step SI 05 is repeated for the next record of an extended storing table.

[0241] When the value of an index register i is beyond a value in an are recording point storing field, it progresses to the following step SI 10, and it is shortly distinguished for the number of sectors of a demand through the distinction means 201 this time whether it is below the number of reservation sectors of an expanded memory field. This distinction is performed by comparing the number of sectors of a demand the value in the number storing field of reservation sectors currently assigned to the data RAM 63, and this time.

[0242] When the number of sectors of a demand is below the number of reservation sectors this time, it progresses to the following step SI 11, and goes into an extended information table retrieval subroutine (extended information table retrieval means 204). When the number of sectors of a demand is larger than the number of reservation sectors on the other hand this time, it progresses to a step SI 12, and through the error signal output means 209, to the I/F controller 25, an error signal is outputted and it forces to terminate. This error signal is supplied to a host computer 31 through the I/F controller 25. It tells that the host computer 31 had an error to the operator through displays connected to this host computer 31 based on supply of the above-mentioned error signal, such as CRT and a liquid crystal display panel.
[0243] By the way, the extended information table retrieval subroutine 204 in the above-mentioned step SI 11 initializes the index register i used as the record read-out index of a storing information table in step SJ01 first, as shown in drawing 35 . That is, initial value "0" is stored in an index register i.
[0244] Next, in step SJ02, the record of the number shown with an index register i is read from an extended information table through the table read-out means 203. That is, the record of i record eye is read from an extended information table. Next, in step SJ03, it is distinguished through the distinction means 201 whether the contents of the above-mentioned i record eye are the EOF codes. When it is not the EOF code, it progresses to the following step SJ04, and the initiation logical address and the termination logical address are read from the above-mentioned i record eye.
[0245] Next, in step SJ05, it is distinguished whether it is between the initiation logical address the initiation logical address of a demand starts the above-mentioned i record eye this time, and the termination logical address through the distinction means 201.
[0246] When the initiation logical address of a demand is between the above-mentioned addresses this time, it progresses to the following step SJ06, and the number of sectors after the initiation logical address of a demand is calculated through the number count means 210 of sectors this time [of the expanded memory field concerning i record eye set up on the extended information table / above-mentioned]. Specifically, it is carried out from the

termination logical address concerning i record eye this time by deducting the value which deducted the initiation logical address of a demand to 1. This number of sectors is stored in an index register k.

[0247] Next, in step SJ07, it is distinguished through the distinction means 201 whether the number of sectors after the initiation logical address of a demand is more than the number of sectors of a demand this time this time [of the expanded memory field concerning i record eye / above-mentioned]. This distinction is performed by whether the value of an index register k is more than the number of sectors of a demand this time. If the value of an index register k is more than the number of sectors of a demand this time, this extended information table retrieval subroutine 204 will be completed.

[0248] When there was nothing between the initiation logical address the initiation logical address of a demand starts the above-mentioned i record eye this time, and the termination logical address in the above-mentioned step SJ05 and it is distinguished on the other hand, it progresses to step SJ08 and index register +1 renewal of i is performed. Then, it progresses to step SJ02, the next record of an extended information table is read, and the processing after step SJ03 is repeated.

[0249] On the other hand, in the above-mentioned step SJ07, when the value of an index register k was smaller than the number of sectors of a demand this time and it is distinguished, or when it is distinguished in the above-mentioned step SJ03 that the contents of the i record eye of an extended information table are the EOF codes, it progresses to step SJ09, and through the error signal output means 209, to the I/F controller 25, an error signal is outputted and it forces to terminate.

[0250] After returning to the main routine of drawing 33 and completing the extended storing table creation subroutine 204 in the above-mentioned step SI 11, it progresses to the following step SI 13, and a table buffer is stored in the record eye corresponding to the value in an extended storing table and in an are recording point storing field through the extended storing table creation means 206. Next, in a step SI 14, the value in an are recording point storing field is updated +one time.

[0251] Next, in the step SI 15 shown by drawing 34 , the parameter for read-

out which should be transmitted to the mechanism controller 28 is created through the parameter creation means 205. It is carried out by specifically storing the address on optical disk D of a demand in the read-out parameter storing field for mechanisms assigned to the data RAM 63 this time which is stored in the table buffer.

[0252] Next, in a step SI 16, the parameter for read-out which should be transmitted to the I/F controller 25 is created through the parameter creation means 205. It is carried out by specifically storing the number of sectors of a demand in the read-out parameter storing field for I/F assigned to the data RAM 63 this initiation logical address stored in the table buffer, and this time.

[0253] Next, in step SBI17, the parameter for read-out stored in the read-out parameter storing field for mechanisms is outputted through the parameter creation means 205 at the same time it outputs a read-out demand signal through the demand output means 208 to the mechanism controller 28. Moreover, the parameter for read-out stored in the read-out parameter storing field for I/F is outputted at the same time it outputs a read-out demand signal to coincidence through the demand output means 208 to the I/F controller 25.

[0254] The mechanism controller 28 is controlled by the input of the read-out demand signal from a system controller 29, and the parameter for read-out to move an optical pickup 3 to the truck corresponding to the address on optical disk D which this parameter shows. And the playback data Di from an optical pickup 3 will be changed into the ROM data Dr by the decoder 24, and will be supplied to the I/F controller 25. Moreover, the ROM-address information Dar corresponding to the above-mentioned ROM data Dr is acquired from a decoder 24, and this ROM-address information Dar is supplied to a system controller 29.

[0255] And a system controller 29 receives the ROM-address information Dar from the decoder 24 sent through input port 64 through the address information read-out means 202 in the step SI 18 of drawing 34 . Next, in a step SI 19, it is distinguished whether the address on optical disk D of a demand is in agreement through the distinction means 201 the address received through the above-mentioned address information read-out means 202 and this time. A step SI 18 and a step SI 19 are repeated until these

addresses are in agreement.

[0256] When the addresses are in agreement, it progresses to the following step SI 20, and an are recording demand signal is outputted to the I/F controller 25 through the demand output means 208. The I/F controller 25 stores the ROM data Dr from a decoder 24 per sector one by one from the initiation logical address determined this time among the expanded memory field EZ based on the input of this are recording demand signal. And the completion signal of are recording is outputted to a system controller 29 in the phase where the demanded ROM data Dr for several sector minutes were stored. The detail about this actuation is mentioned later.

[0257] After outputting an are recording demand signal to the manipulation routine of drawing 34 at return and the above-mentioned step SI 20, it progresses to the following step SI 21, and waits for the input of the completion signal of are recording from the I/F controller 25. It progresses to the following step SI 22 in the phase where the completion signal of are recording was inputted from the I/F controller 25, and a deactivate-request signal is outputted to the mechanism controller 28 through the demand output means 208. The mechanism controller 28 controls various circuits to suspend the playback actuation to optical disk D based on the input of the deactivate-request signal from a system controller 29.

[0258] Next, in a step SI 23, the parameter for a transfer is shortly created through the parameter creation means 205. The number of sectors of a demand is stored the initiation logical address specifically determined as the parameter storing field assigned to the data RAM 63 this time, and this time.

[0259] Next, in a step SI 24, the parameter for a transfer stored in the parameter storing field is outputted through the parameter creation means 205 at the same time it outputs a transfer-request signal through the demand output means 208 to the I/F controller 25. Processing at this step SI 24 will be performed after ending the step SI 07 shown by drawing 33 besides after ending processing of the above-mentioned step SI 23.

[0260] Here, based on the input of the transfer-request signal from a system controller 29, among the expanded memory field EZ, the I/F controller 25 reads the ROM data Dr from the initiation logical address stored in the

parameter for a transfer one by one, and transmits them to a host computer 31 side. And the completion signal of a transfer is outputted to a system controller 29 in the phase where the demanded ROM data Dr for several sector minutes were transmitted to the host computer 31 side. The detail of this actuation is mentioned later.

[0261] After outputting a transfer-request signal to the manipulation routine of drawing 34 at return and the above-mentioned step SI 24, it progresses to the following step SI 25, and waits for the input of the completion signal of a transfer from the I/F controller 25. It progresses to the following step SI 26 in the phase where the completion signal of a transfer was inputted from the I/F controller 25, the renewal means 207 of the number of residual sectors is led, and it is the number of reservation sectors. - It updates. It is carried out by storing again in a reservation sector storing field the value which specifically deducted the number of sectors of a demand from the value stored in the number storing field of reservation sectors this time.

[0262] This extended read-out processing subroutine 98 is completed in the phase which processing at the above-mentioned step SI 26 ended, and the various demand processing subroutines 95 shown in coincidence by drawing 10 are completed.

[0263] After returning to the extended read-out demand subroutine 78 of drawing 29 in the I/F controller 25 and completing the output of the command data to the system controller 29 by the command output means 182 in a step SF 01 again, it progresses to the following step SF 02.

[0264] In this step SF 02, it is distinguished from a system controller 29 through the distinction means 181 whether there was any input of a demand signal. That is, it becomes the waiting for a demand signal input. If a demand signal is inputted from a system controller 29, it will progress to the following step SF 03, and it will be distinguished through the distinction means 181 whether the demand signal inputted from the system controller 29 is a read-out demand signal shortly.

[0265] When it is a read-out demand signal, it progresses to the following step SF 04, and stores in the parameter storing field which receives the parameter for read-out supplied through input port 54 through the parameter receipt

means 183, and is assigned to the data RAM 53. The initiation logical address and the number of sectors of the extended buffer area EZ which should store data will be stored in this parameter storing field by this. Moreover, the above-mentioned initiation logical address is stored in an index register j at this time.

[0266] Next, in a step SF 05, it becomes the input waiting of the are recording demand signal from a system controller 29 through the distinction means 181. When there is an input of an are recording demand signal from a system controller 29, it progresses to the following step SF 06, and goes into an are recording demand processing subroutine (are recording demand processing means 184). This subroutine initializes an index register i in step SG01 first, as shown in drawing 30 . That is, initial value "0" is stored in an index register i.

[0267] Next, in step SG02, the address which should store the ROM data Dr is calculated among the expanded memory field EZ. Specifically, the value adding the value of an index register j and the value of an index register i is stored in an index register j. Next, in step SG03, the ROM data (one sector) Dr from the decoder 24 supplied through input port 54 are read through the playback data read in means 187.

[0268] Next, in step SG04, it writes in the logical address of the expanded memory field where the value of an index register j shows the ROM data (one sector) Dr read at the above-mentioned step SG03 through the playback data write-in means 188. Next, in step SG05, an index register i is updated +one.

[0269] Next, in step SG06, it is distinguished through the distinction means 181 whether it is more than the number of sectors with which the value of an index register i is stored in the parameter storing field. When the value of an index register i is smaller than the number of sectors, it progresses to the above-mentioned step SG02, the logical address stored in the index register j is updated, and the processing after step SG03 is repeated. On the other hand, when the value of the above-mentioned index register i becomes more than the number of sectors, this are recording demand processing subroutine 184 is completed.

[0270] It returns to the main routine of drawing 29 , and in the phase which the are recording demand processing subroutine 184 in the above-mentioned step SF 06 ended, it progresses to the following step SF 07, and the

completion signal of are recording is outputted to a system controller 29 through the completion signal output means 186.

[0271] Next, in a step SF 08, it is distinguished from a system controller 29 through the distinction means 181 whether there was any input of a transfer-request signal. That is, it becomes the waiting for a transfer-request signal input.

[0272] In this step SF 08, if a transfer-request signal is inputted from a system controller 29, or when it was not a read-out demand in the above-mentioned step SF 03 and is distinguished, it stores in the parameter storing field which progresses to the following step SF 09, receives the parameter for a transfer supplied through input port 54 through the parameter receipt means 183, and is assigned to the data RAM 53. The initiation logical address and the number of sectors of a transmit buffer field in which the data which should be transmitted this time are stored will be stored in this parameter storing field by this. Moreover, the above-mentioned initiation logical address is stored in an index register j at this time.

[0273] Next, it goes into a transfer-request processing subroutine (transfer-request processing means 185) in a step SF 10. This subroutine initializes an index register i in step SH01 first, as shown in drawing 31 . That is, initial value "0" is stored in an index register i.

[0274] Next, in step SH02, the address to which data should be transmitted is calculated among the expanded memory field EZ. Specifically, the value adding the value of an index register j and the value of an index register i is stored in an index register j. Next, in step SH03, the ROM data (one sector) Dr stored in the logical address shown with an index register j are read among the expanded memory field EZ through the data readout means 189.

[0275] Next, in step SH04, the ROM data Dr for 1 sector read in the above-mentioned step SH03 are transmitted to a host computer 31 through the data transfer means 190. Next, in step SH05, an index register i is updated +one.

[0276] Next, in step SH06, it is distinguished through the distinction means 181 whether it is more than the number of sectors with which the value of an index register i is stored in the parameter storing field. When the value of an index register i is smaller than the number of sectors, it progresses to the

above-mentioned step SH02, the logical address stored in the index register j is updated, and the processing after step SH03 is repeated. On the other hand, when the value of the above-mentioned index register i becomes more than the number of sectors, this transfer-request processing subroutine 185 is completed.

[0277] It returns to the main routine of drawing 29 , and in the phase which the transfer-request processing subroutine 185 in the above-mentioned step SF 10 ended, it progresses to the following step SF 11, and the completion signal of a transfer is outputted to a system controller 29 through the completion signal output means 186. This extended read-out demand subroutine 78 is completed in the phase which processing at this step SF 11 ended, and the various demand processing subroutines 75 shown in coincidence by drawing 6 are completed.

[0278] When a block transfer command is inputted into the I/F controller 25 from [block transfer processing to a transmit buffer field -> expanded memory field], next a host computer 31, in drawing 6 , it goes into the block transfer-request subroutine (block transfer-request means 79) S104 from the various demand processing subroutines 75.

[0279] A distinction means 221 by which this block transfer-request means 79 performs various distinction as shown in drawing 36 , A command output means 222 to output a command to a system controller 29, A parameter receipt means 223 to receive the parameter for a transfer transmitted from a system controller 29, The data readout means 224 read from the logical address with which the parameter for a transfer shows the ROM data Dr stored in the transmit buffer field one by one, The table read-out means 225 which reads the transfer information table developed by the predetermined field of a data RAM 53 per 1 record, A data write-in means 226 written in per 1 sector one by one from the logical address by which the parameter for a transfer shows the ROM data Dr read with the above-mentioned data readout means 224, To the system controller 29, processing has a completion signal output means 227 to tell, alias ********, and is constituted.

[0280] And this block transfer-request means 79 outputs first the block transfer command data stored in the command storing field to a system

controller 29 through the command output means 222 in the step SK 01 of drawing 37 .

[0281] In a system controller 29, when the block transfer command data from the I/F controller 25 are inputted, it goes into the block transfer processing subroutine (block transfer processing means 99) S304 from the various demand processing subroutines 95 shown by drawing 10 . Block transfer command data consist of the start address on optical disk D which is the data transfer origin accumulated in the transmit buffer field TZ, a number of relative sectors from the start address, a number of sectors of the data which should be read, and the initiation logical address in the expanded memory field EZ which should write in the read data.

[0282] A distinction means 231 by which this block transfer processing means 99 performs various distinction as shown in drawing 38 , An extended information table retrieval means 232 to search the applicable record of the extended information table which corresponds based on these command data, A transfer storing table retrieval means 233 to search the applicable record of the transfer storing table which corresponds based on these command data, A parameter creation means 234 to create the parameter for a transfer for requiring the data transfer to the expanded memory field EZ, and to transmit to the I/F controller 25, An extended storing table creation means 235 to create an extended storing table based on these command data, The number of reservation sectors which decreases in connection with the data accumulation to the expanded memory field EZ - The renewal means 236 of the number of residual sectors for updating, It has a demand output means 237 to output the signal for directing various demands to the I/F controller 25, and the error signal output means 238 for outputting an error signal to the I/F controller 25, and is constituted.

[0283] Moreover, this block transfer processing means 99 is activated with the extended information table retrieval means 232 or the transfer storing table retrieval means 233. The table read-out means 239 which reads the extended information table or transfer storing table developed by the predetermined field of a data RAM 63 per 1 record, respectively, It has a number count means 240 of sectors to calculate the number of sectors of the data for [that

calculates the number of sectors in the expanded memory field EZ for / this / are recording which can be accumulated, or is accumulated in the transmit buffer field TZ / this] a transfer.

[0284] And this block transfer processing means 99 develops first the command data stored in the command storing field to a table buffer in the step SL 01 of drawing 39 . This table buffer is the same as the configuration of one record of the extended storing table shown by drawing 55 (a), and stores command data (the initiation logical address and the number of sectors on the number of address + relative sectors on optical disk D, and the expanded memory field EZ) at this step SL 01 according to the array sequence of one record of an extended storing table.

[0285] Next, in a step SL 02, it is distinguished for the number of sectors of a demand through the distinction means 231 this time whether it is below the number of reservation sectors of the expanded memory field EZ. This distinction is performed by comparing the number of sectors of a demand the value in the number storing field of reservation sectors currently assigned to the data RAM 63, and this time.

[0286] When the number of sectors of a demand is below the number of reservation sectors this time, it progresses to the following step SL 03, and goes into an extended information table retrieval subroutine (extended information table retrieval means 232). This subroutine initializes the index register i used as the record read-out index of an extended information table in a step SM 01 first, as shown in drawing 40 . That is, initial value "0" is stored in an index register i.

[0287] Next, in a step SM 02, the record of the number shown with an index register i is read from an extended information table through the table read-out means 239. That is, the record of i record eye is read from an extended information table.

[0288] Next, in a step SM 03, it is distinguished through the distinction means 231 whether the contents of the above-mentioned i record eye are the EOF codes. or [that progress to the following step SM 04 and the contents of the above-mentioned i record eye are shortly effective through the distinction means 231 when it is not the EOF code] -- it is distinguished whether it is an

invalid. This distinction is performed to the first bit [1st] of i record eye by whether it is "1" and "0." When effective, it progresses to the following step SM 05, and the initiation logical address and the termination logical address are read from the above-mentioned i record eye.

[0289] Next, in a step SM 06, it is distinguished whether it is between the initiation logical address the initiation logical address of a demand starts the above-mentioned i record eye this time, and the termination logical address through the distinction means 231.

[0290] When the initiation logical address of a demand is among both the above-mentioned addresses this time, it progresses to the following step SM 07, and the number of sectors after the initiation logical address of a demand is calculated through the number count means 240 of sectors this time [of the expanded memory field EZ concerning i record eye set up on the extended information table / above-mentioned]. Specifically, it is carried out from the termination logical address concerning i record eye this time by deducting the value which deducted the initiation logical address of a demand to 1. This number of sectors is stored in an index register k.

[0291] Next, in a step SM 08, it is distinguished through the distinction means 231 whether the number of sectors after the initiation logical address of a demand is more than the number of sectors of a demand this time this time [of the expanded memory field EZ concerning i record eye / above-mentioned]. This distinction is performed by whether the value of an index register k is more than the number of sectors of a demand this time. If the value of an index register k is more than the number of sectors of a demand this time, this extended information table retrieval subroutine 232 will be completed.

[0292] When there was nothing between the initiation logical address the initiation logical address of a demand starts the above-mentioned i record eye this time, and the termination logical address in the above-mentioned step SM 06 and it is distinguished on the other hand, or when the contents of the i record eye are distinguished from an invalid in the above-mentioned step SM 04, it progresses to a step SM 09 and index register +1 renewal of i is performed. Then, it progresses to a step SM 02, the next record of an

extended information table is read, and the processing after a step SM 03 is repeated.

[0293] On the other hand, in the above-mentioned step SM 08, when the value of an index register k was smaller than the number of sectors of a demand this time and it is distinguished, or when it is distinguished in the above-mentioned step SM 03 that the contents of the i record eye of an extended information table are the EOF codes, it progresses to a step SM 10, and through the error signal output means 238, to the I/F controller 25, an error signal is outputted and it forces to terminate.

[0294] After returning to the main routine of drawing 39 and completing the extended information table retrieval subroutine 232 in the above-mentioned step SL 03, it progresses to the following step SL 04, and goes into a transfer storing table retrieval subroutine (transfer storing table retrieval means 233). This subroutine initializes the index register i used as the record read-out index of a transfer storing table in step SN01 first, as shown in drawing 41 . That is, initial value "0" is stored in an index register i.

[0295] Next, in step SN02, the record of the number shown with an index register i is read from a transfer storing table through the table read-out means 239. That is, the record of i record eye is read from a transfer storing table.

[0296] Next, in step SN03, it is distinguished through the distinction means 231 whether the contents of the above-mentioned i record eye are the EOF codes. or [that progress to the following step SN04 and the contents of the above-mentioned i record eye are shortly effective through the distinction means 231 when it is not the EOF code] -- it is distinguished whether it is an invalid. This distinction is performed to the first bit [1st] of i record eye by whether it is "1" and "0." It progresses to the following step SN05, and it is distinguished through the distinction means 231 whether the address on optical disk D stored in the above-mentioned i record eye of a transfer storing table is the same as the address on optical disk D of a demand this time.

[0297] When both the addresses are in agreement, it progresses to the following step SN06, and the number of sectors after the relative sector of this time demand of the ROM data Dr stored in the address concerning i record

eye of a transfer storing table is calculated among the transmit buffer field TZ through the number count means 240 of sectors. It is carried out by specifically deducting the number of relative sectors of a demand from the number of sectors concerning i record eye this time. The number of sectors which was able to be found is stored in an index register k.

[0298] Next, in step SN07, it is distinguished through the distinction means 231 whether the number of sectors after the relative sector of this time demand of the ROM data Dr stored in the address concerning i record eye of a transfer storing table is more than the number of sectors of a demand this time. This distinction is performed by whether the value of an index register k is more than the number of sectors of a demand this time. If the value of an index register k is more than the number of sectors of a demand this time, it progresses to the following step SN08, and the initiation logical address of the transmit buffer field TZ concerning i record eye is stored in Register ADD. And this transfer storing table retrieval subroutine 233 is completed in the phase which processing at this step SN08 ended.

[0299] On the other hand, when both the addresses are distinguished from an inequality in the above-mentioned step SN05, or when the contents of the i record eye are distinguished from an invalid in the above-mentioned step SN04, it progresses to step SN09 and index register +1 renewal of i is performed. Then, it progresses to step SN02, the next record of a transfer storing table is read, and the processing after step SN03 is repeated.

[0300] On the other hand, in the above-mentioned step SN07, when the value of an index register k was smaller than the number of sectors of a demand this time and it is distinguished, or when it is distinguished in the above-mentioned step SN03 that the contents of the i record eye of a transfer storing table are the EOF codes, it progresses to step SN10, and through the error signal output means 238, to the I/F controller 25, an error signal is outputted and it forces to terminate.

[0301] After returning to the main routine of drawing 39 and completing the transfer storing table retrieval subroutine 233 in the above-mentioned step SL 04, it progresses to the following step SL 05, and the parameter for a transfer is created through the parameter creation means 234. Specifically, the

initiation logical address (namely, data write-in logical address to the expanded memory field EZ) in the expanded memory field EZ of a demand is stored in the parameter storing field assigned to the data RAM 63 the number of sectors of a demand, and this time the value (namely, data readout logical address from the transmit buffer field TZ) which added the number of relative sectors of a demand to the initiation logical address of the transmit buffer field TZ stored in Register ADD this time, and this time.

[0302] Next, in a step SL 06, the parameter for a transfer stored in the parameter storing field is outputted through the parameter creation means 234 at the same time it outputs a transfer-request signal through the demand output means 237 to the I/F controller 25.

[0303] Here, the I/F controller 25 reads the ROM data Dr from the data readout logical address stored in the parameter for a transfer one by one among the transmit buffer field TZ based on the input of the transfer-request signal from a system controller 29, and writes them in one by one from the data write-in logical address in which this read ROM data Dr is stored among the expanded memory field EZ by the parameter for a transfer. And the completion signal of a transfer is outputted to a system controller 29 in the phase where the demanded ROM data Dr for several sector minutes were written in the expanded memory field EZ. The detail of this actuation is mentioned later.

[0304] After outputting a transfer-request signal to the manipulation routine of drawing 39 at return and the above-mentioned step SL 06, it progresses to the following step SL 07, and waits for the input of the completion signal of a transfer from the I/F controller 25. It progresses to the following step SL 08 in the phase where the completion signal of a transfer was inputted from the I/F controller 25, and a table buffer is stored in the record eye corresponding to the value in an extended storing table and in an are recording point storing field through the extended storing table creation means 235. Next, in a step SL 09, the value in an are recording point storing field is updated +one time.

[0305] Next, in a step SL 10, the renewal means 236 of the number of residual sectors is led, and it is the number of reservation sectors. - It updates. It is carried out by storing again in a reservation sector storing field the value

which specifically deducted the number of sectors of a demand from the value stored in the number storing field of reservation sectors this time.

[0306] On the other hand, in the above-mentioned step SL 02, when the number of sectors of a demand is larger than the number of reservation sectors this time, it progresses to a step SL 11 and an error signal is outputted to the I/F controller 25 through the error signal output means 238.

[0307] In the phase which processing at the above-mentioned step SL 10 or processing at the above-mentioned step SL 11 ended, this block transfer processing subroutine 99 is completed, and the various demand processing subroutines 95 shown in coincidence by drawing 10 are completed.

[0308] After returning to the block transfer-request subroutine 79 of drawing 37 in the I/F controller 25 and completing the output of the command data to the system controller 29 by the command output means 222 in a step SK 01 again, it progresses to the following step SK 02.

[0309] In this step SK 02, it is distinguished from a system controller 29 through the distinction means 221 whether there was any input of a demand signal. That is, it becomes the waiting for a demand signal input. If a demand signal is inputted from a system controller 29, it progresses to the following step SK 03, and stores in the parameter storing field which receives the parameter for a transfer supplied through input port 54 through the parameter receipt means 223, and is assigned to the data RAM 53. The initiation logical address of the transmit buffer field which should read data, the initiation logical address of the extended buffer area which should store data, and the number of sectors will be stored in this parameter storing field by this. Moreover, at this time, the initiation logical address of the transmit buffer field which should read data to an index register j is stored, and the initiation logical address of the extended buffer area which should store data in an index register k is stored.

[0310] Next, in a step SK 04, the index register p used as an index register i and the record read-out index of a transfer information table is initialized. That is, initial value "0" is stored in each index registers i and p.

[0311] Next, in a step SK 05, the record of the number shown with an index register p is read from a transfer information table through the table read-out

means 225. That is, the record of p record eye is read from a transfer information table. Next, in a step SK 06, an index register p is updated +one.
[0312] Next, in a step SK 07, it is distinguished whether it is between the initiation logical address the data readout initiation logical address (value of an index register j) of a demand starts the above-mentioned p record eye this time, and the termination logical address through the distinction means 221. When there is no data readout initiation logical address of a demand among both the above-mentioned addresses this time, it returns to the above-mentioned step SK 05, the next record of a transfer information table is read, and the processing after a step SK 06 is repeated.
[0313] In the above-mentioned step SK 07, when the data readout initiation logical address of a demand was among both the above-mentioned addresses this time and it is distinguished, it progresses to the following step SK 08, and the address of the data which should be read from a transmit buffer field is calculated. Specifically, the value adding the value of an index register j and the value of an index register i is stored in an index register j.
[0314] Next, in a step SK 09, it is distinguished through the distinction means 221 whether the value of an index register j is larger than the termination logical address concerning the above-mentioned p record eye. When larger than the termination logical address concerning the record eye concerned which the value of an index register j read, it progresses to the following step SK 10, the record of p record eye of a transfer information table is read, and the initiation logical address concerning this p record eye is stored in an index register j. Next, in a step SK 11, an index register p is updated +one.
[0315] Next, in a step SK 12, the ROM data (one sector) Dr stored in the logical address shown with an index register j are read among the transmit buffer field TZ through the data readout means 224. Next, in a step SK 13, it writes in the logical address of the expanded memory field EZ where the value of an index register k shows the ROM data (one sector) Dr read at the above-mentioned step SK 12 through the data write-in means 226. Next, in a step SK 14, index registers i and k are updated +one time, respectively.
[0316] Next, in a step SK 15, it is distinguished through the distinction means 221 whether it is more than the number of sectors with which the value of an

index register i is stored in the parameter storing field.

[0317] When the value of an index register i is smaller than the number of sectors, it returns to the above-mentioned step SK 08, the logical address stored in the index register j is updated, and the processing after a step SK 09 is repeated. On the other hand, when the value of the above-mentioned index register i becomes more than the number of sectors, it progresses to the following step SK 16, and the completion signal of a transfer is outputted to a system controller 29 through the completion signal output means 227. This block transfer-request subroutine 79 is completed in the phase which processing at this step SK 16 ended, and the various demand processing subroutines 75 shown in coincidence by drawing 6 are completed.

[0318] When an extended write-in command is inputted into the I/F controller 25 from [data transfer processing to a host computer -> expanded memory field], next a host computer 31, in drawing 6 , it goes into the extended write request subroutine (extended write request means 80) S105 from the various demand processing subroutines 75.

[0319] A distinction means 251 by which this extended write request means 80 performs various distinction as shown in drawing 42 , A command output means 252 to output a command to a system controller 29, A parameter receipt means 253 to receive the parameter for a transfer transmitted from a system controller 29, The data readout means 254 which reads the data transmitted from a host computer 31, A data write-in means 255 written in per 1 sector one by one from the logical address by which the parameter for a transfer shows the data from the host computer 31 read with this data readout means 254, To the system controller 29, processing has a completion signal output means 256 to tell, alias ********, and is constituted.

[0320] And this extended write request means 80 outputs first the extended write-in command data stored in the command storing field to a system controller 29 through the command output means 252 in the step SP 01 of drawing 43 .

[0321] In a system controller 29, when the extended write-in command data from the I/F controller 25 are inputted, it goes into the extended write-in processing subroutine (extended write-in processing means 100) S305 from

the various demand processing subroutines 95 shown by drawing 10 . Extended write-in command data consist of the initiation logical address in the expanded memory field EZ which should write in the data from a host computer 31, and a number of sectors of these ********** data.

[0322] A distinction means 261 by which this extended write-in processing means 100 performs various distinction as shown in drawing 44 , An extended information table retrieval means 262 to search the applicable record of the extended information table which corresponds based on these command data, A parameter creation means 263 to create the parameter for a transfer for requiring the data transfer to the expanded memory field EZ, and to transmit to the I/F controller 25, An extended storing table creation means 264 to create an extended storing table based on these command data, The number of reservation sectors which decreases in connection with the data accumulation to the expanded memory field EZ - The renewal means 265 of the number of residual sectors for updating, It has a demand output means 266 to output the signal for directing various demands to the I/F controller 25, and the error signal output means 267 for outputting an error signal to the I/F controller 25, and is constituted.

[0323] Moreover, it activates with the extended information table retrieval means 262 besides the various above-mentioned means, and this extended write-in processing means 100 has the table read-out means 268 which reads the extended information table developed by the predetermined field of a data RAM 63 per 1 record, and a number count means 269 of sectors to calculate the number of sectors in the expanded memory field for [this] are recording which can be accumulated.

[0324] And this extended write-in processing means 100 develops first the command data stored in the command storing field to a table buffer in step SQ01 of drawing 45 . This table buffer is the same as the configuration of one record of the extended storing table shown by drawing 55 (a), and the code which shows that it is data from a host computer 31 is stored in the field to which command data (the initiation logical address and the number of sectors on the expanded memory field EZ) are stored according to the array sequence of one record of an extended storing table, and the address on

optical disk D of a table buffer is stored further at this step SL 01.

[0325] Next, in step SQ02, it is distinguished for the number of sectors of a demand through the distinction means 261 this time whether it is below the number of reservation sectors of the expanded memory field EZ. This distinction is performed by comparing the number of sectors of a demand the value in the number storing field of reservation sectors currently assigned to the data RAM 63, and this time.

[0326] When the number of sectors of a demand is below the number of reservation sectors this time, it progresses to the following step SQ03, and goes into an extended information table retrieval subroutine (extended information table retrieval means 262). This subroutine initializes the index register i used as the record read-out index of an extended information table in a step SR 01 first, as shown in drawing 46 . That is, initial value "0" is stored in an index register i.

[0327] Next, in a step SR 02, the record of the number shown with an index register i is read from an extended information table through the table read-out means 268. That is, the record of i record eye is read from an extended information table.

[0328] Next, in a step SR 03, it is distinguished through the distinction means 261 whether the contents of the above-mentioned i record eye are the EOF codes. or [that progress to the following step SR 04 and the contents of the above-mentioned i record eye are shortly effective through the distinction means 261 when it is not the EOF code] -- it is distinguished whether it is an invalid. This distinction is performed to the first bit [1st] of i record eye by whether it is "1" and "0." When effective, it progresses to the following step SR 05, and the initiation logical address and the termination logical address are read from the above-mentioned i record eye.

[0329] Next, in a step SR 06, it is distinguished whether it is between the initiation logical address the initiation logical address of a demand starts the above-mentioned i record eye this time, and the termination logical address through the distinction means 261.

[0330] When the initiation logical address of a demand is among both the above-mentioned addresses this time, it progresses to the following step SR

07, and the number of sectors after the initiation logical address of a demand is calculated through the number count means 269 of sectors this time [of the expanded memory field EZ concerning i record eye set up on the extended information table / above-mentioned]. Specifically, it is carried out from the termination logical address concerning i record eye this time by deducting the value which deducted the initiation logical address of a demand to 1. This number of sectors is stored in an index register k.

[0331] Next, in a step SR 08, it is distinguished through the distinction means 261 whether the number of sectors after the initiation logical address of a demand is more than the number of sectors of a demand this time this time [of the expanded memory field EZ concerning i record eye / above-mentioned]. This distinction is performed by whether the value of an index register k is more than the number of sectors of a demand this time. If the value of an index register k is more than the number of sectors of a demand this time, this extended information table retrieval subroutine 262 will be completed.

[0332] When there was nothing between the initiation logical address the initiation logical address of a demand starts the above-mentioned i record eye this time, and the termination logical address in the above-mentioned step SR 06 and it is distinguished on the other hand, or when the contents of the i record eye are distinguished from an invalid in the above-mentioned step SR 04, it progresses to a step SR 09 and index register +1 renewal of i is performed. Then, it progresses to a step SR 02, the next record of an extended information table is read, and the processing after a step SR 03 is repeated.

[0333] On the other hand, in the above-mentioned step SR 08, when the value of an index register k was smaller than the number of sectors of a demand this time and it is distinguished, or when it is distinguished in the above-mentioned step SR 03 that the contents of the i record eye of an extended information table are the EOF codes, it progresses to a step SR 10, and through the error signal output means 267, to the I/F controller 25, an error signal is outputted and it forces to terminate.

[0334] After returning to the main routine of drawing 45 and completing the

extended information table retrieval subroutine 262 in the above-mentioned step SQ03, it progresses to the following step SQ04, and the parameter for a transfer is created through the parameter creation means 263. Specifically, the number of sectors of a demand is stored in the parameter storing field assigned to the data RAM 63 the initiation logical address on the expanded memory field EZ of a demand, and this time this time which is stored in the table buffer.

[0335] Next, in step SQ05, the parameter for a transfer stored in the parameter storing field is outputted through the parameter creation means 263 at the same time it outputs a transfer-request signal through the demand output means 266 to the I/F controller 25.

[0336] Here, the I/F controller 25 writes in the data transmitted from a host computer 31 one by one among the expanded memory field EZ from the initiation logical address in which it is stored by the parameter for a transfer based on the input of the transfer-request signal from a system controller 29. And the completion signal of a transfer is outputted to a system controller 29 in the phase where the demanded data for several sector minutes were written in the expanded memory field. The detail of this actuation is mentioned later.

[0337] After outputting a transfer-request signal to the main routine of drawing 45 at return and the above-mentioned step SQ05, it progresses to the following step SQ06, and waits for the input of the completion signal of a transfer from the I/F controller 25. It progresses to the following step SQ07 in the phase where the completion signal of a transfer was inputted from the I/F controller 25, and a table buffer is stored in the record eye corresponding to the value in an extended storing table and in an are recording point storing field through the extended storing table creation means 264. Next, in step SQ08, the value in an are recording point storing field is updated +one time.

[0338] Next, in step SQ09, the renewal means 265 of the number of residual sectors is led, and it is the number of reservation sectors. - It updates. It is carried out by storing again in a reservation sector storing field the value which specifically deducted the number of sectors of a demand from the value stored in the number storing field of reservation sectors this time.

[0339] On the other hand, in the above-mentioned step SQ02, when the number of sectors of a demand is larger than the number of reservation sectors this time, it progresses to step SQ10 and an error signal is outputted to the I/F controller 25 through the error signal output means 267.
[0340] In the phase which processing at the above-mentioned step SQ09 or processing at the above-mentioned step SQ10 ended, this extended write-in processing subroutine 100 is completed, and the various demand processing subroutines 95 shown in coincidence by drawing 10 are completed.
[0341] After returning to the extended write request subroutine 80 of drawing 43 in the I/F controller 25 and completing the output of the command data to the system controller 29 by the command output means 252 in a step SP 01 again, it progresses to the following step SP 02.
[0342] In this step SP 02, it is distinguished from a system controller 29 through the distinction means 251 whether there was any input of a demand signal. That is, it becomes the waiting for a demand signal input. If a demand signal is inputted from a system controller 29, it progresses to the following step SP 03, and stores in the parameter storing field which receives the parameter for a transfer supplied through input port 54 through the parameter receipt means 253, and is assigned to the data RAM 53. The initiation logical address and the number of sectors of an extended buffer area which should store the data from a host computer 31 will be stored in this parameter storing field by this. Moreover, the initiation logical address of the extended buffer area which should store data in an index register j is stored at this time.
[0343] Next, an index register i is initialized in a step SP 04. That is, initial value "0" is stored in each index register i. Next, in a step SP 05, the address which should store data in an expanded memory field is calculated. Specifically, the value adding the value of an index register j and the value of an index register i is stored in an index register j. Next, in a step SP 06, the data (one sector) from the host computer 31 supplied through input port 54 are read through the data readout means 254.
[0344] Next, in a step SP 07, it writes in the logical address of the expanded memory field EZ where the value of an index register k shows the data (one sector) from the host computer 31 read at the above-mentioned step SP 06

through the data write-in means 255. Next, in a step SP 08, index registers i and k are updated +one time, respectively.

[0345] Next, in a step SP 09, it is distinguished through the distinction means 251 whether it is more than the number of sectors with which the value of an index register i is stored in the parameter storing field.

[0346] When the value of an index register i is smaller than the number of sectors, it returns to the above-mentioned step SP 05, the logical address stored in the index register j is updated, and the processing after a step SP 06 is repeated. On the other hand, when the value of the above-mentioned index register i becomes more than the number of sectors, it progresses to the following step SP 10, and the completion signal of a transfer is outputted to a system controller 29 through the completion signal output means 256. This extended write request subroutine 80 is completed in the phase which processing at this step SP 10 ended, and the various demand processing subroutines 75 shown in coincidence by drawing 6 are completed.

[0347] When an extended transfer command is inputted into the I/F controller 25 from [data transfer processing to an expanded memory field -> host computer], next a host computer 31, in drawing 6 , it goes into the extended transfer-request subroutine (extended transfer-request means 81) S106 from the various demand processing subroutines 75.

[0348] A distinction means 271 by which this extended transfer-request means performs various distinction as shown in drawing 47 , A command output means 272 to output a command to a system controller 29, A parameter receipt means 273 to receive the parameter for a transfer transmitted from a system controller 29, The data readout means 274 which reads the data stored in the logical address which the parameter for a transfer shows among the expanded memory field EZ, To a data transfer means 275 to transmit the data read with this data readout means 274 to a host computer 31, and the system controller 29, processing has a completion signal output means 276 to tell, alias ********, and is constituted.

[0349] And this extended transfer-request means 81 outputs first the extended transfer command data stored in the command storing field to a system controller 29 through the command output means 272 in the step SS 01 of

drawing 48 .

[0350] In a system controller 29, when the extended transfer command data from the I/F controller 25 are inputted, it goes into the extended transfer processing subroutine (extended transfer processing means 101) S306 from the various demand processing subroutines 95 shown by drawing 10 . Extended transfer command data consist of the initiation logical addresses and the numbers of sectors of the expanded memory field EZ which should read data.

[0351] A distinction means 281 by which this extended transfer processing means 101 performs various distinction as shown in drawing 49 , The table read-out means 282 which reads the extended information table developed by the predetermined field of a data RAM 63 per 1 record, A parameter creation means 283 to create the parameter for a transfer for requiring a data transfer, and to transmit to the I/F controller 25, It has a demand output means 284 to output the signal for directing various demands to the I/F controller 25, and the error signal output means 285 for outputting an error signal to the I/F controller 25, and is constituted.

[0352] And this extended transfer processing means 101 initializes the index register i used as the record read-out index of an extended information table in the step ST 01 of drawing 50 first. That is, initial value "0" is stored in an index register i.

[0353] Next, in a step ST 02, the record of the number shown with an index register i is read from an extended information table through the table read-out means 282. That is, the record of i record eye is read from an extended information table.

[0354] Next, in a step ST 03, it is distinguished through the distinction means 281 whether the contents of the above-mentioned i record eye are the EOF codes. or [that progress to the following step ST 04 and the contents of the above-mentioned i record eye are shortly effective through the distinction means 281 when it is not the EOF code] -- it is distinguished whether it is an invalid. This distinction is performed to the first bit [1st] of i record eye by whether it is "1" and "0." When effective, it progresses to the following step ST 05, and the initiation logical address and the termination logical address are

read from the above-mentioned i record eye.

[0355] Next, in a step ST 06, it is distinguished whether it is between the initiation logical address the initiation logical address of a demand starts the above-mentioned i record eye this time, and the termination logical address through the distinction means 281.

[0356] When the initiation logical address of a demand is among both the above-mentioned addresses this time, it progresses to the following step ST 07, and the parameter for a transfer is created through the parameter creation means 283. Specifically, the number of sectors of a demand is stored in the parameter storing field assigned to the data RAM 63 the initiation logical address on the expanded memory field of a demand, and this time this time which is stored in the command storing field.

[0357] Next, in a step ST 08, the parameter for a transfer stored in the parameter storing field is outputted through the parameter creation means 283 at the same time it outputs a transfer-request signal through the demand output means 284 to the I/F controller 25.

[0358] Here, based on the input of the transfer-request signal from a system controller 29, among the expanded memory field EZ, the I/F controller 25 reads data from the initiation logical address stored in the parameter for a transfer one by one, and transmits them to a host computer 31 side. And the completion signal of a transfer is outputted to a system controller 29 in the phase where the demanded data for several sector minutes were transmitted to the host computer 31 side. The detail of this actuation is mentioned later.

[0359] After outputting a transfer-request signal to the manipulation routine of drawing 50 at return and the above-mentioned step ST 08, it progresses to the following step ST 09, and waits for the input of the completion signal of a transfer from the I/F controller 25. This extended transfer processing subroutine 101 is completed in the phase where the completion signal of a transfer was inputted from the I/F controller 25, and the various demand processing subroutines 95 shown in coincidence by drawing 10 are completed.

[0360] When there was nothing between the initiation logical address the initiation logical address of a demand starts the above-mentioned i record eye this time, and the termination logical address in the above-mentioned step ST

06 and it is distinguished on the other hand, or when the contents of the i record eye are distinguished from an invalid in the above-mentioned step ST 04, it progresses to a step ST 10 and index register +1 renewal of i is performed. Then, it progresses to a step ST 02, the next record of an extended information table is read, and the processing after a step ST 03 is repeated.

[0361] On the other hand, in a step ST 03, when it is distinguished that the contents of the i record eye of an extended information table are the EOF codes, it progresses to a step ST 11, and through the error signal output means 285, to the I/F controller 25, an error signal is outputted and it forces to terminate.

[0362] After returning to the extended transfer-request subroutine 81 of drawing 48 in the I/F controller 25 and completing the output of the command data to the system controller 29 by the command output means 272 in a step SS 01 again, it progresses to the following step SS 02.

[0363] In this step SS 02, it is distinguished from a system controller 29 through the distinction means 271 whether there was any input of a transfer-request signal. That is, it becomes the waiting for a demand signal input. If a transfer-request signal is inputted from a system controller 29, it progresses to the following step SS 03, and stores in the parameter storing field which receives the parameter for a transfer supplied through input port 54 through the parameter receipt means 273, and is assigned to the data RAM 53. The initiation logical address with which the data which should be transmitted to a host computer 31 are stored, and its number of sectors will be stored in this parameter storing field among the expanded memory field EZ by this. Moreover, the initiation logical address of the above-mentioned extended buffer area is stored in an index register j at this time.

[0364] Next, an index register i is initialized in a step SS 04. That is, initial value "0" is stored in each index register i. Next, in a step SS 05, the address which should read data from an expanded memory field is calculated. Specifically, the value adding the value of an index register j and the value of an index register i is stored in an index register j. Next, in a step SS 06, the data (one sector) stored in the logical address shown with an index register j

are read among the expanded memory field EZ through the data readout means 274.

[0365] Next, in a step SS 07, the data for 1 sector read in the above-mentioned step SS 06 are transmitted to a host computer 31 through the data transfer means 275. Next, in a step SS 08, an index register i is updated +one. Next, in a step SP 09, it is distinguished through the distinction means 271 whether it is more than the number of sectors with which the value of an index register i is stored in the parameter storing field.

[0366] When the value of an index register i is smaller than the number of sectors, it returns to the above-mentioned step SS 05, the logical address stored in the index register j is updated, and the processing after a step SS 06 is repeated. On the other hand, when the value of the above-mentioned index register i becomes more than the number of sectors, it progresses to the following step SS 10, and the completion signal of a transfer is outputted to a system controller 29 through the completion signal output means 276. This extended transfer-request subroutine 81 is completed in the phase which processing at this step SS 10 ended, and the various demand processing subroutines 75 shown in coincidence by drawing 6 are completed.

[0367] When a reservation discharge command is inputted into the I/F controller 25 from [reservation discharge processing of an expanded memory field], next a host computer 31, in the various demand processing subroutines 75 (step S107) shown by drawing 6 , the reservation discharge command data stored in the command storing field are outputted to a system controller 29 through the command output means 82 (refer to drawing 4). These various demand processing subroutines 75 are completed in this phase.

[0368] In a system controller 29, when the reservation discharge command data from the I/F controller 25 are inputted, it goes into the reservation discharge processing subroutine (reservation discharge processing means 102) S307 from the various demand processing subroutines 95 shown by drawing 10 . Reservation discharge command data consist of the head logical addresses of the expanded memory field EZ by which current reservation is carried out.

[0369] A distinction means 291 by which this reservation discharge

processing means 102 performs various distinction as shown in drawing 51 , The table read-out means 292 which reads the extended information table or extended storing table developed by the predetermined field of a data RAM 63 per 1 record, respectively, The extended storing table processing means 293 for carrying out deletion of the record set as the reservation discharge object of the expanded memory field EZ among the extended storing table, It has the effective-bits resetting means 294 for resetting the effective bits of the applicable record in an extended information table, and the error signal output means 296 for outputting an error signal to the I/F controller 25, and is constituted.

[0370] Moreover, it activates with the extended storing table processing means 293 besides the various above-mentioned means, and this reservation discharge processing means 102 has the record deletion migration means 295 which deletes the applicable record of an extended storing table and carries out migration processing of the whole record group.

[0371] And this reservation discharge processing means 102 initializes the index register i used as the record read-out index of an extended information table in step SU01 of drawing 52 first. That is, initial value "0" is stored in an index register i.

[0372] Next, in step SU02, the record of the number shown with an index register i is read from an extended information table through the table read-out means 292. That is, the record of i record eye is read from an extended information table. Next, in step SU03, it is distinguished through the distinction means 291 whether the contents of the above-mentioned i record eye are the EOF codes. When it is not the EOF code, it progresses to the following step SU04, and the initiation logical address and the termination logical address are read from the above-mentioned i record eye.

[0373] Next, in step SU05, it is distinguished through the distinction means 291 whether the initiation logical address of the above-mentioned i record eye is the same as the logical address of a demand this time which is stored in the command storing field. When both the addresses are in agreement, it progresses to the following step SU06, and the effective bits of the i record eye concerned are reset through the effective-bits resetting means 294, and

let this i record eye be an invalid.

[0374] Next, it goes into an extended storing table processing subroutine (extended storing table processing means 293) in step SU07. This subroutine initializes the index register j used as the record read-out index of an extended storing table in a step SV 01 first, as shown in drawing 53 . That is, initial value "0" is stored in an index register j.

[0375] Next, in a step SV 02, the record of the number shown with an index register j is read from an extended storing table through the table read-out means 292. That is, the record of j record eye is read from an extended information table.

[0376] Next, in a step SV 03, it is distinguished through the distinction means 291 whether the logical address of a demand is between the initiation logical address of i record eye and the termination logical address this time. When the logical address of a demand is among both the above-mentioned addresses this time, it progresses to the following step SV 04, and j record eye of an extended storing table is deleted through the record deletion migration means 295, a record eye or subsequent ones is moved further (j+1), and it considers as j record eye or subsequent ones.

[0377] Next, in a step SV 05, the value of an index register j is amended with the above-mentioned record deletion migration. In processing at the above-mentioned step SV 05, or the above-mentioned step SV 03, when there is no logical address of a demand between the initiation logical address of i record eye, and the termination logical address this time, it progresses to the following step SV 06, and an index register j is updated +one.

[0378] Next, in a step SV 07, it is distinguished through the distinction means 291 whether processing was completed about all records. This distinction is performed by whether it is beyond the value with which the value of an index register j is stored in the are recording point storing field. When the value of an index register is smaller than the value stored in the are recording point storing field, it returns to a step SV 02, the next record of an extended storing table is read, and the processing after a step SV 03 is repeated.

[0379] In the above-mentioned step SV 07, when it is distinguished that it is beyond the value with which the value of an index register j is stored in the

are recording point storing field, this extended storing table processing subroutine 293 is completed.

[0380] It returns to the main routine of drawing 52 , this reservation discharge processing subroutine 102 is completed in the phase which the extended storing table processing subroutine 293 in the above-mentioned step SU07 ended, and the various demand processing subroutines 95 shown in coincidence by drawing 10 are completed.

[0381] On the other hand, when it is distinguished that the logical address of a demand and the initiation logical address concerning the above-mentioned i record eye are inharmonious in the above-mentioned step SU05 this time, it progresses to step SU08 and index register +1 renewal of i is performed. Then, it progresses to step SU02, the next record of an extended information table is read, and the processing after a step SR 03 is repeated.

[0382] On the other hand, in the above-mentioned step SU03, when it is distinguished that the contents of the i record eye of an extended information table are the EOF codes, it progresses to step SU09, and through the error signal output means 296, to the I/F controller 25, an error signal is outputted and it forces to terminate.

[0383] Thus, in the regenerative apparatus concerning this example, the playback means Dr, i.e., the ROM data reproduced through the optical pickup 3 -> RF amplifier section 21 -> demodulator circuit 22 -> decoder 24, is temporarily accumulated in the transmit buffer field TZ among the storage regions of a data buffer 26, and they are transmitted to a host computer 31 through the I/F controller 25 after that. To this transmit buffer field TZ, the data on optical disk D chiefly reproduced through the above-mentioned playback means will be temporarily stored from that data transfer origin being optical disk D. In this case, the past data will be eliminated and current data will be overwritten.

[0384] Especially, in this example, even if two or more expanded memory fields EZ are assigned at random on a data buffer 26 Since these expanded memory field EZ is dealt with as a write protect field in false, these expanded memory field EZ is avoided and he is trying to store the ROM data Dr only in the transmit buffer field TZ continuously, It becomes possible to make the

ROM data Dr with large sector size transmit to a host computer 31, without caring about existence of the expanded memory field EZ.

[0385] Moreover, since he is trying to register such data information (address on optical disk D etc.) into a transfer storing table at it as these data are stored up from the next address of the termination logical address of the last data accumulation part in the case of the data transfer which goes via the transmit buffer field TZ, the data concerning the demand will be stored in the transmit buffer field TZ at random for every demand of data transfer. That is, much data with which the addresses on optical disk D differ on the transmit buffer field TZ will be developed. The probability which reads the data already stored in the transmit buffer field TZ in the case of a read-out demand will increase, and it becomes possible from this to shorten the access time of a read-out demand.

[0386] Although the ROM data Dr reproduced with the above-mentioned playback means are stored also in the expanded memory field EZ among the storage regions of a data buffer 26, since the data permutation to the data-hold part which was accumulated in this case unlike the case of the data accumulation to the above-mentioned transmit buffer field TZ is forbidden on the other hand, data elimination of the past is carried out and it is not said that current data are overwritten. That is, the data once stored in the expanded memory field EZ will be held on this expanded memory field EZ, without being influenced by the data readout from subsequent optical disk D.

[0387] Therefore, if the data of the address where the read-out frequency on optical disk D is high are stored up in the expanded memory field EZ and it is made to store up the data of the other address in the transmit buffer field TZ temporarily When the data of the address where read-out frequency is high are transmitted to a host computer 31, The data which it becomes unnecessary to say that data are read from the applicable address on optical disk D through a playback means one by one, and are stored in the expanded memory field EZ can be made transmitted to the direct host computer 31.

[0388] Consequently, it is lost that the data-access time amount over a regenerative apparatus is dependent on the mean access time of a regenerative apparatus, and it becomes possible to demonstrate the engine

performance more than this mean access time in false.

[0389] Since it is such, the effectiveness of the data buffer 26 (for example, semiconductor memory) incorporated in order to aim at improvement in data transmission efficiency can fully be demonstrated, and the data on optical disk D can be made to transmit to a host computer 31 efficiently in the regenerative apparatus concerning this example.

[0390] Moreover, it becomes possible by the input of the extended write-in command from the host computer 31 to the I/F controller 25 and a system controller 29 to make it accumulate in this expanded memory field EZ also of the data transmitted from the host computer 31. In this case, when the capacity of the memory which a host computer 31 owns runs short, it becomes possible to use this expanded memory field EZ as external storage of a host computer 31.

[0391] Moreover, it is based on a reservation demand from the above-mentioned host computer 31 at the I/F controller 25 and a system controller 29. Since he is trying to establish the reservation demand means 76 and the reservation processing means 96 of assigning the storage region of a data buffer 26 to the transmit buffer field TZ and the expanded memory field EZ logically, When there is no reservation demand from a host computer 31, a storage region will be used as a transmit buffer field TZ as it is, and the data from optical disk D will be transmitted to a host computer 31 through a storage region.

[0392] And based on the reservation demand from a host computer 31, a storage region is logically assigned to the transmit buffer field TZ and the expanded memory field EZ through the reservation demand means 76 and the reservation processing means 96, and a data access which was mentioned above is performed through the transmit buffer field TZ and the expanded memory field EZ after that. That is, it becomes possible to transmit the data of the random address on optical disk D to a host computer 31 through the transmit buffer field TZ from optical disk D, and to transmit the data of the address where read-out frequency is high to a host computer 31 through the expanded memory field EZ. Moreover, it also becomes possible to store up the data from a host computer 31 in the expanded memory field

EZ.

[0393] In the above-mentioned configuration thus, the storage region of a data buffer 26 It not only uses it as a transmit buffer field TZ whose data transfer origin is only optical disk D, but Since it can realize only by giving the reservation demand from a host computer 31 to use some of the fields as an expanded memory field EZ in which data transfer origin is also optical disk D, and is also a host computer 31, The data buffer 26 (semiconductor memory) built in the regenerative apparatus can be made to be fully able to utilize, and the effectiveness by this data buffer 26 can fully be demonstrated.

[0394] Set in the above-mentioned configuration and to moreover, the data readout demand to the predetermined address on optical disk D determined beforehand The extended read-out demand means 78 and the extended read-out processing means 98 which only a first time demand transmits the data of the applicable address on optical disk D to a host computer 31 through the expanded memory field EZ, The extended transfer-request means 81 and the extended transfer processing means 101 of transmitting the data currently held to the expanded memory field EZ at the read-out demand of the 2nd henceforth to a host computer 31, To data readout demands other than the predetermined address on optical disk D Since he is trying to establish the read-out demand means 77 and the read-out processing means 97 of transmitting the data of the applicable address on optical disk D to a host computer 31 through the transmit buffer field TZ, the following effectiveness will be done so.

[0395] When there is a read-out demand of data other than the predetermined address with which it was beforehand determined on optical disk D, the ROM data Dr reproduced through the playback means are transmitted to a host computer 31 through the transmit buffer field TZ in a data buffer 26 through the read-out demand means 77 and the read-out processing means 97. Also when transmitting data other than the predetermined address to a host computer 31 after next time, the data of the above-mentioned address reproduced with the playback means are transmitted to a host computer 31 through the transmit buffer field TZ through the read-out demand means 77 and the read-out processing means 97. That is, while sequential overwrite of

the data in the transmit buffer field TZ is carried out, data transfer to a host computer 31 is performed.

[0396] On the other hand, when there is a read-out demand of the data of the predetermined address with which it was beforehand determined on optical disk D First, in a first time demand, the data of the above-mentioned address reproduced through the playback means are stored in the expanded memory field EZ in a data buffer 26 through the extended read-out demand means 78 and the extended read-out processing means 98. Furthermore, the data stored in the above-mentioned expanded memory field EZ through the extended read-out demand means 78 and the extended read-out processing means 98 will be transmitted to a host computer 31.

[0397] After next time, when transmitting the data of the predetermined address to a host computer 31, the data stored in the expanded memory field EZ will be shortly transmitted to a host computer 31 as it is through the extended transfer-request means 81 and the extended transfer processing means 101. When transmitting the data of the predetermined address to a host computer 31 concretely, the data which it becomes unnecessary to say that data are read from the applicable address on optical disk D through a playback means one by one, and are stored in the expanded memory field EZ can be made transmitted to the direct host computer 31. That is, shift processing can be realized. This leads to large shortening of data-access time amount.

[0398] Moreover, in the above-mentioned configuration, it is based on a block transfer request from a host computer 31. [when the block transfer-request means 79 and the block transfer processing means 99 of transmitting the data currently temporarily held to the transmit buffer field TZ to the expanded memory field EZ are established] For example, when the data of the 2nd predetermined address on optical disk D determined in late-coming are stored in the transmit buffer field TZ through the read-out demand means 77 and the read-out processing means 97 Based on the block transfer request from a host computer 31, the data in the above-mentioned transmit buffer field TZ will be transmitted to the expanded memory field EZ through the block transfer-request means 79 and the block transfer processing means 99.

[0399] This becomes effective when the address where read-out frequency is high in late-coming becomes clear. That is, in accordance with [of a regenerative apparatus] use, the address where read-out frequency is high may be proved in late-coming that it is the case where it has become clear from the beginning. When the data of the address where this read-out frequency that became clear in late-coming is high are stored in the transmit buffer field TZ through the read-out demand means 77 and the read-out processing means 97, this example It becomes possible to make the expanded memory field EZ carry out transfer are recording through the block transfer-request means 79 and the block transfer processing means 99. In case the data of the address where the read-out frequency which became clear [above-mentioned] in late-coming is high after next time are transmitted, the data which are not from optical disk D and are stored in the expanded memory field EZ can be transmitted to a host computer 31. Consequently, the data transfer between a regenerative apparatus and a host computer 31 can be made to perform still more efficiently.

[0400] Moreover, since he is trying to have the address and the relative sector on optical disk D as that demand command in this block transfer request, In the host computer 31 among the data stored in the transmit buffer field TZ The thing which is used frequently and which choose only data, such as multiplier data and a parameter for an operation, for example becomes possible, and it becomes possible to store up these data in the predetermined expanded memory field EZ determined by the command further.

[0401] Moreover, since he is trying to establish the extended write request means 80 and the extended write-in processing means 100 which writes the data transmitted from the host computer 31 in the expanded-memory field EZ based on the data write request from a host computer 31, it becomes possible in the above-mentioned configuration to store up the data transmitted from the host computer 31 through the extended write request means 80 and the extended write-in processing means 100 in this expanded-memory field EZ based on the data write request from a host computer 31. In this case, when the capacity of the memory which a host computer 31 owns runs short, it becomes possible to use this expanded memory field EZ as external storage

of a host computer.

[0402] Moreover, in the above-mentioned configuration, since the reservation discharge processing means 102 which cancels logical allotment with the transmit buffer field TZ to a data buffer 26 and the expanded memory field EZ by the above-mentioned reservation demand means 76 and the reservation processing means 96, and makes the expanded memory field EZ for a demand the transmit buffer field TZ was made to prepare based on the reservation discharge demand from a host computer 31, it becomes effective in the following cases.

[0403] That is, by making into the transmit buffer field TZ the expanded memory field EZ which starts the demand concerned with the reservation discharge processing means 102 in access to the optical disk with which the fixed data which do not need to perform a data access frequently were recorded, 1 time of data transfer size can be enlarged, and the access time to the above optical disk D can be shortened efficiently (for example, when the data currently recorded on the optical disk are a sequential file format etc.).

[0404] In the above-mentioned example, although the data buffer 26 was constituted from volatile semiconductor memory of DRAM or SRAM, it is also possible to adopt the following configurations. That is, the part which is made to determine the storage region which turns into the expanded memory field EZ beforehand among data buffers 26 (it is made to determine by a specification design stage etc.), among those serves as the transmit buffer field TZ is constituted from volatile semiconductor memory (volatility RAM), and the part used as the expanded memory field EZ consists of non-volatile semiconductor memory (nonvolatile RAM), such as a flash memory and EEPROM.

[0405] And the 1st memory controller which controls access to the transmit buffer field TZ (volatility RAM), and the 2nd memory controller which controls access to an expanded memory field (nonvolatile RAM) are formed in the I/F controller 25, and you may make it control the activation to each memory controller for it according to the demand from a system controller 29.

[0406] In this case, the data created by program actuation in the regenerative apparatus, For example, the data created by the logical address read to a

degree, and various parameter lists by program actuation in the host computer 31, For example, by writing the high address, various parameters, etc. of read-out frequency which became clear in late-coming in the expanded memory field EZ through the extended write request means 80 and the extended write-in processing means 100 Also in the power-source halt back or sudden power off, the above-mentioned data can be held and it becomes possible to perform subsequent systems maintenance easily.

[0407] Although the above-mentioned example explained CD-ROM to the subject as the optical disk D, it is possible to apply to the phase change form optical disk and magneto-optic disk only for playbacks. In order to make it correspond to each optical disk D, a next configuration is the same as what is shown by drawing 1 , and good. [that what is necessary is just to incorporate the arithmetic circuit suitable for each format in a demodulator circuit] That is, it is because it can carry out without being outputted with the same data gestalt from a demodulator circuit 22 also when optical disk D is any, and caring about the class of optical disk D in access to a data buffer 26.

[0408]

[Effect of the Invention] As mentioned above, the rotation driving means which according to the regenerative apparatus concerning this invention it is equipped with a disc-like record medium, and carries out the rotation drive of the disc-like record medium with which it was this equipped, The playback means which reproduces information data to the above-mentioned disc-like record medium, The control means which controls the above-mentioned rotation driving means and the above-mentioned playback means at least, A storage means to hold temporarily the information data reproduced through the above-mentioned playback means, In the regenerative apparatus which has an interface means to transmit the information data memorized by the above-mentioned storage means to an external device according to the read-out demand from the above-mentioned control means Since the storage region of the above-mentioned store was assigned to the transmit buffer field whose data transfer origin is a disc-like record medium, and the expanded memory field to which the data permutation of as opposed to [data transfer origin is arbitrary and] a data-hold part was forbidden The data of the address

where the read-out frequency on a disc-like record medium is high are stored up in an expanded memory field. The data of the other address can be temporarily stored up in a transmit buffer field. Consequently, when the data of the address where read-out frequency is high are transmitted to an external device, The data which it becomes unnecessary to say that data are read from the applicable address on a disc-like record medium through a playback means one by one, and are stored in the expanded memory field can be made transmitted to a direct external device.

[0409] It is lost by this that the data-access time amount over a regenerative apparatus is dependent on the mean access time of a regenerative apparatus, and it becomes possible to demonstrate the engine performance more than this mean access time in false.

[0410] Therefore, the effectiveness of the storage means (for example, semiconductor memory) incorporated in order to aim at improvement in data transmission efficiency can fully be demonstrated, and the data on a disc-like record medium can be made to transmit to an external device efficiently in the regenerative apparatus concerning this invention now.

[0411] Moreover, since the data transfer origin of an expanded memory field is arbitrary, it becomes possible to make it accumulate in this expanded memory field also of the data transmitted from the external device. In this case, when the capacity of the memory which an external device owns runs short, it becomes possible to use this expanded memory field as external storage of an external device.

[0412] Moreover, according to the regenerative apparatus concerning this invention, in the above-mentioned configuration, it is based on an expanded memory reservation demand from the above-mentioned external device. Since an expanded memory reservation means to assign the storage region of the above-mentioned storage means to the above-mentioned transmit buffer field and the above-mentioned expanded memory field logically was established It not only uses the storage region of a storage means as a transmit buffer field whose data transfer origin is only a disc-like record medium, but Since it can realize only by giving the expanded memory reservation demand from an external device when data transfer origin wants

to use some of the fields as arbitrary expanded memory fields, The storage means (semiconductor memory) built in the regenerative apparatus can be made to be fully able to utilize, and the effectiveness by this storage means can fully be demonstrated.

[0413] According to the regenerative apparatus concerning this invention, set in the above-mentioned configuration and to moreover, the data readout demand to the predetermined address on the above-mentioned disc-like record medium determined beforehand Only a first time demand transmits the data of the applicable address on the above-mentioned disc-like record medium to the above-mentioned external device through the above-mentioned expanded memory field. The 1st transfer means which transmits the data currently held to the above-mentioned expanded memory field to the read-out demand of the 2nd henceforth at the above-mentioned external device, To data readout demands other than the above-mentioned predetermined address on the above-mentioned disc-like record medium Since the 2nd transfer means which transmits the data of the applicable address on the above-mentioned disc-like record medium to the above-mentioned external device through the above-mentioned transmit buffer field was established When transmitting the data of the predetermined address to an external device, the data which it becomes unnecessary to say that data are read from the applicable address on a disc-like record medium through a playback means one by one, and are stored in the expanded memory field can be made transmitted to a direct external device.

[0414] Moreover, in the above-mentioned configuration, since the regenerative apparatus concerning this invention established the 3rd transfer means which transmits the data currently temporarily held to the above-mentioned transmit buffer field to an expanded memory field based on the transfer request between fields from the above-mentioned external device, when the address where read-out frequency is high in late-coming becomes clear, it becomes effective. That is, in accordance with [of a regenerative apparatus] use, the address where read-out frequency is high may be proved in late-coming that it is the case where it has become clear from the beginning. When the data of the address where this read-out frequency that became

clear in late-coming is high are stored in a transmit buffer field through the 2nd transfer means, this invention It becomes possible to make an expanded memory field carry out transfer are recording through the 3rd transfer means, and after next time, in case the data of the address where the read-out frequency which became clear [above-mentioned] in late-coming is high are transmitted The data which are not from a disc-like record medium and are stored in the expanded memory field can be transmitted to an external device. Consequently, the data transfer between a regenerative apparatus and an external device can be made to perform still more efficiently.

[0415] Moreover, since the data write-in means which writes the data transmitted from the above-mentioned external device in the above-mentioned expanded memory field in the above-mentioned configuration based on the data write request from the above-mentioned external device was established according to the regenerative apparatus concerning this invention It becomes possible to store up the data transmitted from the external device through the data write-in means in this expanded memory field based on the data write request from an external device. When the capacity of the memory which an external device owns runs short, it becomes possible to use this expanded memory field as external storage of an external device.

[0416] Moreover, the regenerative apparatus concerning this invention is based on a reservation discharge demand from the above-mentioned external device in the above-mentioned configuration. Logical allotment with the above-mentioned transmit buffer field to the above-mentioned storage means and the above-mentioned expanded memory field by the above-mentioned expanded memory reservation means is canceled. Since the reservation discharge means which makes the expanded memory field concerning the whole storage region of the above-mentioned storage means or the demand concerned a transmit buffer field was established In access to the disc-like record medium (for example, when the data currently recorded on the disc-like record medium are a sequential file format etc.) with which the fixed data which do not need to perform a data access frequently were recorded By making into a transmit buffer field the expanded memory field which starts the

whole record section or the demand concerned with the above-mentioned reservation discharge means, 1 time of data transfer size can be enlarged, and the access time to the above disc-like record media can be shortened efficiently.

[0417] Moreover, since the regenerative apparatus concerning this invention constituted the above-mentioned expanded memory field from semiconductor memory of a non-volatile among the above-mentioned storage means in the above-mentioned configuration The data created by program actuation in the regenerative apparatus, for example, data created by the address read to a degree, and various parameter lists by program actuation in the external device, For example, by writing the high address, various parameters, etc. of read-out frequency which became clear in late-coming in an expanded memory field through a data write-in means, the above-mentioned data can be held after a power-source halt, and it becomes possible to perform subsequent systems maintenance easily.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the example (it is hereafter described as the regenerative apparatus only applied to an example) which applied the optical disk (CD-ROM) only for [the regenerative apparatus concerning this invention] playbacks to the CD-ROM drive equipment used as a record medium as external storage of a host computer.

[Drawing 2] In the regenerative apparatus concerning this example, it is the explanatory view showing the example of logical allotment of the expanded memory field to a data buffer.

[Drawing 3] It is the block diagram showing the hard configuration of an I/F controller.

[Drawing 4] It is the functional block diagram showing the data transfer

processing means in an I/F controller.

[Drawing 5] It is the flow chart which shows actuation of the data transfer processing means in an I/F controller.

[Drawing 6] It is the flow chart which shows actuation of the various demand processing means in an I/F controller.

[Drawing 7] It is the block diagram showing the hard configuration of a system controller.

[Drawing 8] It is the functional block diagram showing the command-processing means in a system controller.

[Drawing 9] It is the flow chart which shows actuation of the command-processing means in a system controller.

[Drawing 10] It is the flow chart which shows actuation of the various demand processing means in a system controller.

[Drawing 11] It is the functional block diagram showing the reservation demand means in an I/F controller.

[Drawing 12] It is the flow chart which shows actuation of the reservation demand means in an I/F controller.

[Drawing 13] It is the functional block diagram showing the reservation processing means in a system controller.

[Drawing 14] It is the flow chart which shows actuation of the reservation processing means in a system controller.

[Drawing 15] It is the flow chart which shows actuation of the extended information table creation means within the reservation processing means of a system controller.

[Drawing 16] It is the flow chart (the 1) which shows actuation of the transfer information table creation means within the reservation processing means of a system controller.

[Drawing 17] It is the flow chart (the 2) which shows actuation of the transfer information table creation means within the reservation processing means of a system controller.

[Drawing 18] It is the functional block diagram showing the read-out demand means in an I/F controller.

[Drawing 19] It is the flow chart which shows actuation of the read-out

demand means in an I/F controller.

[Drawing 20] It is the flow chart which shows actuation of the are recording demand means within the read-out demand means of an I/F controller.

[Drawing 21] It is the flow chart which shows actuation of the transfer-request means within the read-out demand means of an I/F controller.

[Drawing 22] It is the functional block diagram showing the read-out processing means in a system controller.

[Drawing 23] It is the flow chart (the 1) which shows actuation of the read-out processing means in a system controller.

[Drawing 24] It is the flow chart (the 2) which shows actuation of the read-out processing means in a system controller.

[Drawing 25] It is the flow chart which shows actuation of the logical address decision processing means within the read-out processing means of a system controller.

[Drawing 26] It is the flow chart which shows actuation of the transfer storing table creation means within the read-out processing means of a system controller.

[Drawing 27] It is the flow chart which shows actuation of the EOF code storing processing means within the read-out processing means of a system controller.

[Drawing 28] It is the functional block diagram showing the extended read-out demand means in an I/F controller.

[Drawing 29] It is the flow chart which shows actuation of the extended read-out demand means in an I/F controller.

[Drawing 30] It is the flow chart which shows actuation of the are recording demand means within the extended read-out demand means of an I/F controller.

[Drawing 31] It is the flow chart which shows actuation of the transfer-request means within the extended read-out demand means of an I/F controller.

[Drawing 32] It is the functional block diagram showing the extended read-out processing means in a system controller.

[Drawing 33] It is the flow chart (the 1) which shows actuation of the extended read-out processing means in a system controller.

[Drawing 34] It is the flow chart (the 2) which shows actuation of the extended read-out processing means in a system controller.
[Drawing 35] It is the flow chart which shows actuation of the extended information table retrieval means within the extended read-out processing means of a system controller.
[Drawing 36] It is the functional block diagram showing the block transfer-request means in an I/F controller.
[Drawing 37] It is the flow chart which shows actuation of the block transfer-request means in an I/F controller.
[Drawing 38] It is the functional block diagram showing the block transfer processing means in a system controller.
[Drawing 39] It is the flow chart which shows actuation of the block transfer processing means in a system controller.
[Drawing 40] It is the flow chart which shows actuation of the extended information table retrieval means within the block transfer processing means of a system controller.
[Drawing 41] It is the flow chart which shows actuation of the transfer storing table retrieval means within the block transfer processing means of a system controller.
[Drawing 42] It is the functional block diagram showing the extended write request means in an I/F controller.
[Drawing 43] It is the flow chart which shows actuation of the extended write request means in an I/F controller.
[Drawing 44] It is the functional block diagram showing the extended write-in processing means in a system controller.
[Drawing 45] It is the flow chart which shows actuation of the extended write-in processing means in a system controller.
[Drawing 46] It is the flow chart which shows actuation of the extended information table retrieval means within the extended write-in processing means of a system controller.
[Drawing 47] It is the functional block diagram showing the extended transfer-request means in an I/F controller.
[Drawing 48] It is the flow chart which shows actuation of the extended

transfer-request means in an I/F controller.

[Drawing 49] It is the functional block diagram showing the extended transfer processing means in a system controller.

[Drawing 50] It is the flow chart which shows actuation of the extended transfer processing means in a system controller.

[Drawing 51] It is the functional block diagram showing the reservation discharge processing means in a system controller.

[Drawing 52] It is the flow chart which shows actuation of the reservation discharge processing means in a system controller.

[Drawing 53] It is the flow chart which shows actuation of the extended storing table processing means within the reservation discharge processing means of a system controller.

[Drawing 54] It is the explanatory view showing the configuration of each record of an extended information table and a transfer information table, and the bit pattern of an information flag.

[Drawing 55] It is the explanatory view showing the configuration of each record of an extended storing table and a transfer storing table.

[Description of Notations]

D Optical disk

2 Spindle Motor

3 Optical Pickup

4 Signal-processing System

7 Sliding Mechanism for Optical Pickups

8 Objective Lens

9 2-dimensional Actuator

10 APC Circuit

21 RF Amplifier Section

22 Demodulator Circuit

23 D/A Converter

24 Decoder

25 I/F Controller

26 Data Buffer

27 Servo Control Section

28 Mechanism Controller

29 System Controller

31 Host Computer

TZ Transmit buffer field

EZ Expanded memory field

56,66 CPU

53 63 Data RAM

54 64 Input port

55 65 Output port

71 Data Transfer Processing Means

75 Various Demand Processing Means

76 Reservation Demand Means

77 Read-out Demand Means

78 Extended Read-out Demand Means

79 Block Transfer-Request Means

80 Extended Write Request Means

81 Extended Transfer-Request Means

82 Command Output Means

91 Command-Processing Means

95 Various Demand Processing Means

96 Reservation Processing Means

97 Read-out Processing Means

98 Extended Read-out Processing Means

99 Block Transfer Processing Means

100 Extended Write-in Processing Means

101 Extended Transfer Processing Means

102 Reservation Discharge Processing Means